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30 Apr 1969, Group-4, per document marking, DoDD 5200.10; SAMSO USAF ltr, 28 Feb 1972	

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SAN DIEGO

24-486

22 Apr 67

S. S. E. G.
S-124-59
AUG 7 1959
due to 101-59

CHARACTERISTICS OF TACTICAL,
STRATEGIC AND RESEARCH
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~~DOO DR 50040~~

14 GDC-ZM-486

REPAIRED BY

C. M. Hanson (14)
C. M. Hanson

24 15

Missile Pre Design

54020

G. S. Dittmars

1990

W. E. Strohmeyer

D D C
 MAR 29 1968
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(147650)

NO.	DATE	BY	CHANGES	PAGES AFFECTED
1	6/24/57	C. Hanson	Additional Pages	20 pages
2	7/22/57	C. Hanson	Revised & Additional Pages	24 pages
3	11/5/57	C. Hanson	Revised and Additional Pages	44 Pages
4	3/3/58	C. Hanson	Additional Pages	5 Pages

ANALYSIS
PREPARED BY
CHECKED BY
REVISED BY

C O N V A I R
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO

PAGE
REPORT NO.
MODEL
DATE

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INTRODUCTION

In recognition of the scarcity of compiled information pertaining to this country's present missile systems and the need for such material, this is an attempt toward such a compilation.

Since this report is based upon information available in our own library, it is limited; however, an attempt will be made to keep this material up to date. Any additions or amplifications by readers of this report are earnestly solicited.

Sincere thanks is extended to the Engineering Library Personnel for their invaluable contributions to the acquisition of these data.

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(Att: SMSP)

Lawrence, Calif. 90047

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C O N V A I R
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO

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REPORT NO.
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CHARACTERISTICS OF STRATEGIC AND TACTICAL MISSILES

CONFIDENTIAL

Date 4/22/57

Prepared By C. H. Hanson

Checked By

Revised Date 7/22/57

SAN DIEGO, CALIFORNIA

Model SM 67A

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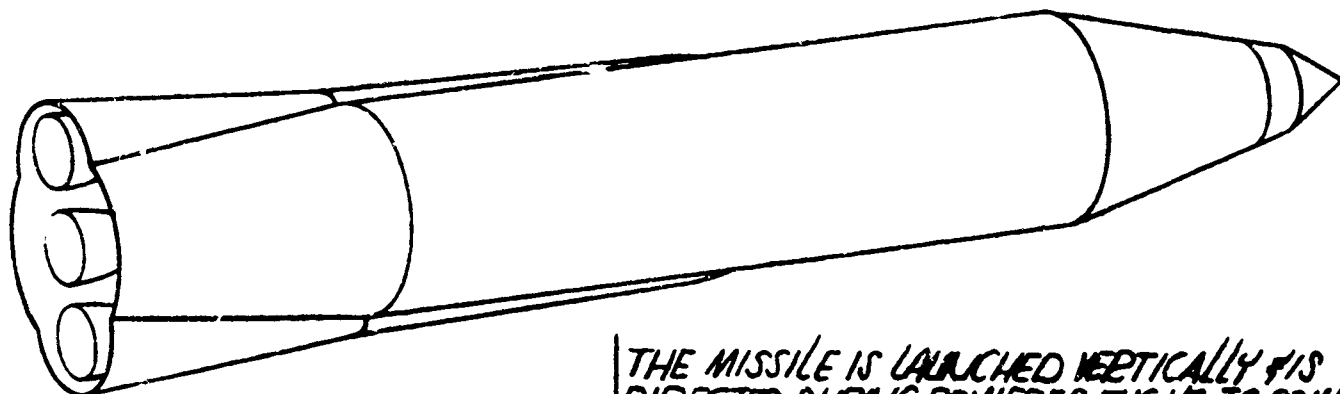
Penn

Report No. ZM-486

SPONSOR: AIE FORCE

MFGR. CONVAIR-ASTRONAUTICS DIV.

ATLAS



LENGTH: 82'

DIAMETER: 150"

SPAN: NO SURFACES

WEIGHT: 240,000*

WARHEAD: 1500*

GUIDANCE: COMMAND & BALLISTIC (AZUSA)

PROPULSION: LIQUID PROPELLANT ROCKETS (SEE PROPULSION DATA SHEET)

RANGE: 5500 N.M.I.

VELOCITY: M=23

ALTITUDE: 500 N.M.I.

REMARKS: CAPTIVE FLIGHT TESTS IN MID-1957
FIRST FLIGHT JUNE '57

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REFERENCE:
Form 1277-C

CONVAIR-TM 339-42-2 SEPT. 1956

GR. 4
DOWNGRADED AT 3 YEAR INTER-
VALS. DECLASSIFIED AFTER
12 YEARS.
DOD DIR 5200.10

THE MISSILE IS LAUNCHED VERTICALLY & IS
DIRECTED DURING POWERED FLIGHT TO COME
AT THE POWER CUT-OFF POINT WITH AN
ELLIPTICAL PATH WHICH INTERSECTS THE
TARGET. FOLLOWING POWER CUT-OFF
THE NOSE IS SEPARATED FROM THE
AIR FRAME; IT THEN FOLLOWS THIS
ELLIPTICAL PATH IN A FREE-FALL
TRAJECTORY. ALL GUIDANCE IS
ACCOMPLISHED DURING THE BRIEF
PERIOD OF POWERED FLIGHT.

Date 4/23/57

Prepared By M. HANSON

Checked By

Revised Date

CONVAIR

A DIVISION OF GENERAL DYNAMICS CORPORATION

SAN DIEGO, CALIFORNIA

Model. _____

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SECRET

Report No. ZM-486

ATLAS

<u>DIMENSIONS, IN FEET</u>	<u>SM-65</u>	<u>XSM-65A</u>
LENGTH-OVERALL (ASSEMBLED)	82.0	82.0
-NOSE SECTION	3.5	3.5
-ADAPTER SECTION	5.1	5.1
-TANK SECTION	61.1	61.1
-BODY SECTION (TANKS & ADAPTER)	64.0	64.0
-PROPULSION SECTION	14.8	14.8
DIAMETER-MAX. (PROPULSION SECTION)	16.2	16.2
-TANK'S	10.0	10.0

<u>WEIGHT, IN POUNDS</u>		
GROSS (LAUNCHING WT.)	20,254	20,254
EMPTY WEIGHT (INCL. PAYLOAD & RESIDUALS)	17,028	17,028
FABRICATED WT. (NO P.L., BALLAST OR RESIDUALS)	13,042	14,673
PAYLOAD	1,500	NONE
EXPENDABLE FLUIDS & GASES		
FUEL, JP-4	69,174	56,042
OXIDIZER LOX	156,368	126,026
OTHER	279	188
TOTAL EXPENDABLE	225,821	182,256

JETTISONED WEIGHT

6,584 NONE

SECRET

Date 4/23/57

Prepared By C.M. HANSON

Checked By

Revised Date

CONVA

DIVISION OF GENERAL DYNAMICS CORPORATION

SAN DIEGO, CALIFORNIA

Model

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Report No. ZM-486

ATLAS

<u>WEIGHTS, IN POUNDS</u>		
	<u>SM-65</u>	<u>XSM-65A</u>
NOSE SECTION	3,500	3,500
BODY SECTION (TANKS & ADAPTER)	2,857	4,972
PROPULSION SECTION (NON-JETTISONED)	1,849	5,018
FIXED EQUIPMENT (NON-JETTISONED)	879	1,550
TEST EQUIPMENT	NONE	2,373
PAINT	NONE	100
RESIDUAL FLUIDS & GASES (UNEXPENDED)	985	1,515
BURNOUT WEIGHT	10,070	19,028

PROPULSION DATA.

① BOOSTER ROCKET ENGINE (2 THRUST CHAMBERS) SEA LEVEL THRUST		
	300,000*	270,000*
SUSTAINER ROCKET ENGINE (1 THRUST CHAMBER) SEA LEVEL THRUST		
	60,000*	NONE
③ VERNIER ROCKET ENGINE (2 THRUST CHAMBERS) SEA LEVEL JET THRUST EACH CHAMBER		
	1,000*	1,000*
SEA LEVEL AXIAL THRUST EACH CHAMBER		
	940*	940*
TOTAL AXIAL THRUST @ SEA LEVEL	361,880*	271,880*

SECRET

REF: TECH. PROGRESS INFO. (CONVAIR) ZR-7-056-1 JAN. '56.

Date 9/15/57

Prepared By CM. HANSON

Checked By

Revised Date

CONVAIR

A DIVISION OF GENERAL DYNAMICS CORPORATION

SAN DIEGO, CALIFORNIA

Model MX-1601

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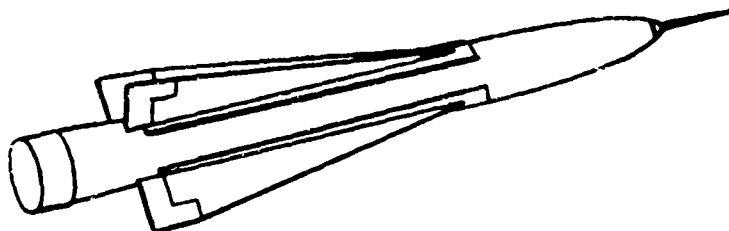
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Report No. ZM-486

SPONSOR: C. J. RUELLE

MFGR: RAYTHEON

B-DM



LENGTH: 195'

DIAMETER: 7.9'

SPAN: 25"

WEIGHT: 1300[±] WITHOUT BOOSTER

WARHEAD:

GUIDANCE: TELEMETERING SYSTEM

PROPULSION: SOLID PROPELLANT ROCKET

RANGE: 13 N.MI.

VELOCITY: M=25

ALTITUDE: 60,000'

REMARKS: CONTROL SYSTEM TO PRODUCE 180° TURNS.
JET VALVES ARE USED. OPERATIONAL 1960.
BOMBER DEFENSE MISSILE CAPABLE
OF VERTICAL OR REARWARD LAUNCH
AND TURN IN ANY DIRECTION.

SECRET

REFERENCE.
Form 1277-C

NRL/JHU/TG-60-19 JUNE 15/55. CONVAIR-TM 339-42-2

Date 3/19/57
Prepared By C.M. HANSON
Checked By
Revised Date 7/22/57

CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA
Model MX-1964

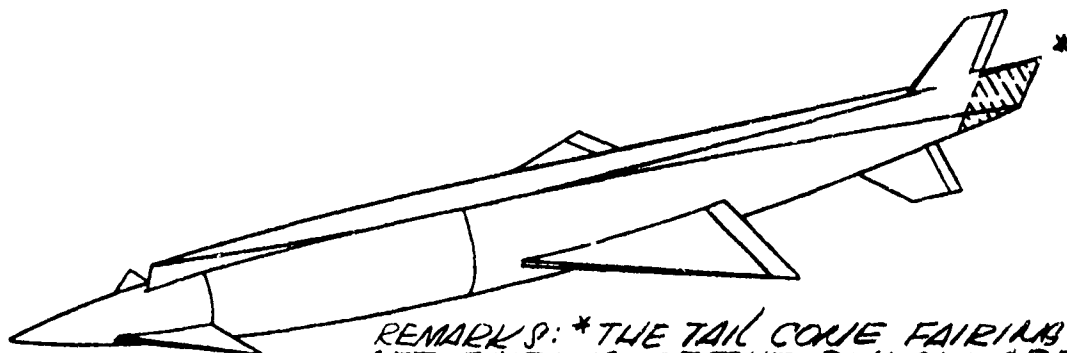
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Report No. ZM-486

SPONSOR: AIR FORCE
LGR: CONVAIR F.W.

B-58 POD



REMARKS: *THE TAIL CONE FAIRING AND
JET FAIRING OF THE PYLON ARE JET-
TISONED FOR ROCKET POWERED
FLIGHTS.

LENGTH. 669"

DIAMETER: 60" MAX

SPAN. WING = 205.62" CANARD = 111.9"

WEIGHT: (2800# W.H.) 11,295#, (7000# W.H.) 14,555#,
(20,000# W.H.) 28,545#

WARHEAD: 2,800#, 7,000#, 20,000#

GUIDANCE: BOOST-GLIDE = NON EMANATING, TWO AXIS
INERTIAL TYPE SYSTEM.

PROPULSION LIQUID ROCKET, 15,000# THRUST FOR 65 SEC.

RANGE: (2800# W.H.) 173 N.M.I., (7,000# W.H.) 121 N.M.I.,
(20,000# W.H.) 63 N.M.I.

VELOCITY: M = 2.0

ALTITUDE. LAUNCH @ 60,000'

REMARKS THE PODP IS CARRIED TO ITS OPERATIONAL AREA BY THE B-58
AIRPLANE OF WHICH IT IS A COMPONENT PART UNTIL SEPAR-
ATION. AFTER LAUNCH THE ROCKET ENGINE BOOSTS
THE PODP TO HIGHER MACH NUMBERS & ALTITUDE. THE
POD THEN GLIDES TO THE IMMEDIATE
TARGET AREA AND DESCRIBES A TERMINAL
DIVE TO THE TARGET

REFERENCE. CONVAIR-FZA-4-098 1 JULY 54.

Form 1277-C

Date 6/18/57
Prepared By C.M. HANSON
Checked By
Revised Date

CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA
Model _____

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Report No. ZH-486

SECRET

B-58 POD

PROPULSION UNIT DATA

THRUST = 15,000* @ 70,000' ALT. (THRUST VARIES WITH ALTITUDE).

I_{sp} = 255 SEC.

PROPELLANT FLOW RATE = 58.77 LBS/SEC.

PROPELLANT = JP-4 FUEL & RED FUMING NITRIC ACID OXIDIZER.

CHAMBER PRESSURE = 550 PSIA.

MIXTURE RATIO = 4.25* RFNA TO 1* JP-4.

THE MOTOR INCORPORATES A SELF FED TURBINE PUMP UNIT WHICH INCLUDES A SOLID PROPELLANT IGNITER, GAS GENERATOR, TURBINE, ACID PUMP AND FUEL PUMP.

THE INSIDE DIA. OF THE NOZZLE @ EXIT = 18 IN, AND THE DIA. OF THE AREA WHICH ENCOMPASSES THE TURBINE PUMP AND LINES TO THE COMBUSTION CHAMBER IS APPROX. 22 IN.

REF: FZA-4-093, 1 JULY 1954

SECRET

Date 25 OCT '53

Prepared By DITMARS

Checked By

Revised Date 3/18/57
CM HANSON

CONVAIR SECRET

A DIVISION OF GENERAL DYNAMICS CORPORATION

SAN DIEGO, CALIFORNIA

Model XAAM

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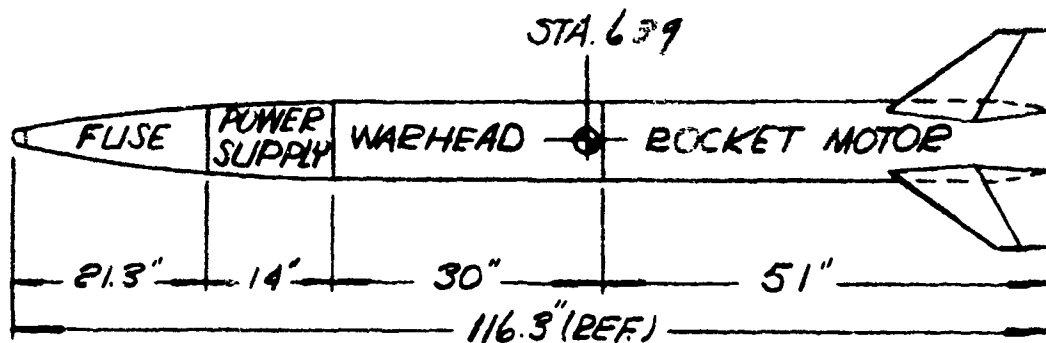
Penn

Report No. ZM-486

SPONSOR: AIR FORCE

MFGR. DOUGLAS

BIRD DOG



LENGTH: 116.3" TARGET PHASE II 100" MAX.

DIAMETER: 80" NOSE RADIUS = .75"

SPAN: 24" ROOT CHORD = 18.5" TIP CHORD = 6"

WEIGHT: 311#

WARHEAD: 150# FRAGMENTATION (140 GRAIN; TENTATIVE)

GUIDANCE: NONE - POWER SUPPLY FOR FUZE

PROPULSION: SPARROW S.R. ROCKET I-14,400 LB. SEC.

RANGE: LETHAL RADIUS = 100'

VELOCITY: SUPERSONIC

ALTITUDE:

REMARKS: F102 REQUIRES MISSILE BAY EXTENSION
TO CARRY 6 MISSILES.

SEE E.

REFERENCE: DITMARS' TRIP TO DOUGLAS 11-27-53

Form 1277-C

Date 10-3-54

Prepared By DITMAES

Checked By

Revised Date 8-20-57
C.M. HANSON

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SAN DIEGO, CALIFORNIA

Model XASM-XAAM

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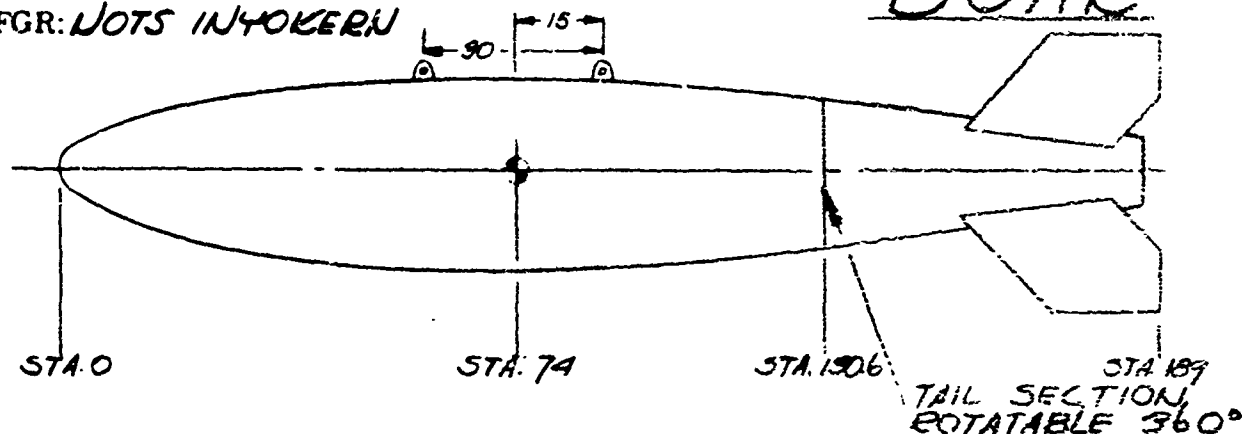
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Penk

Report No. ZM-486

SPONSOR: BUORD

MFGR: NOTS IN YOKERU



LENGTH: 189"

DIAMETER: 30.5" (11.25" @ BASE)

SPAN: 54" $C_R = 30"$ $C_T = 19"$ SWEEP = 45°

WEIGHT: LAUNCH = 1950* BURN-OUT = 1720*

WARHEAD: MARK VII

GUIDANCE: NONE ~ DETONATION TIMER

PROPULSION: S.P. ROCKET ~ E7DS-16,000 ($T = 14,600$, $t_b = 2.97$)

RANGE:

VELOCITY: SUB SONIC SHAPE

ALTITUDE:

REMARKS: FINS ROTATABLE & FOLDABLE

SECRET:

REFERENCE: SK-368861 - NOTS (4-17-53)

Form 1277-C

Date *2/11/57*
Prepared By *C. M. HANSON*
Checked By
Revised Date

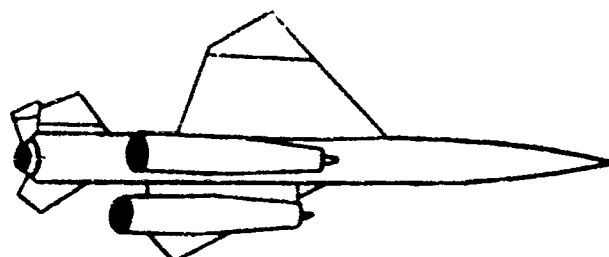
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A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA
Model *1M-99*

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Report No. *ZM-486*

SPONSOR: *AIR FORCE*
MFGR: *BOEING*

BOMARC



LENGTH: *420"*

DIAMETER: *35"*

① MISSILE <i>4N</i>	<i>623-3</i>
GROSS WT.	<i>11,550</i>
EMPTY WT.	<i>5781</i>
OXIDIZER WT. (ACID)	<i>3946</i>
FUEL WT. (JP-3)	<i>1071</i>
RAM JET FUEL WT (JP-3)	<i>752</i>

SPAN: *WING = 168", WING AREA = 45 FT.², HORIZ. TAIL = 15 FT.²
VERT. TAIL = 4 FT.²*

WEIGHT: *12,300 * MAX. FOR 50,000' ALT., 8,000 * TARGET (TACTICAL)*

WARHEAD: *300 * (ULTIMATELY NUCLEAR)*

GUIDANCE: *PROGRAMMED CLIMB, COMMAND CRUISE, ACTIVE TARGET SEEKER
(PULSE TYPE RADAR) AN/APQ-41 AI*

PROPULSION: *CRUISE - 2 MARQUARDT 28" DIA RAM JETS (XRFJ-43-MA-3)
BOOST - 1 AEROJET LIQUID ROCKET (XLR-59-AJ-5) W/FNA+JP4*

RANGE: *185 N.MI. (ULTIMATE 250 N.MI.)*

VELOCITY: *M = 2.7*

ALTITUDE: *50,000' (ULTIMATELY - 80,000')*

REMARKS: *INTEGRAL BOOSTER - TIPS OF ALL SURFACES MOVE-
ABLE FOR CONTROL - WING PLAN FORM - RAKED
TIP DELTA.*

SECRET

REFERENCE: *D 11508 BOMARC PR. 48 DEC. '52 (01757)
D P.B. #11 SEP 7. 53*

Form 1277-C

Date 7 SEPT. 1956
Prepared By CHALK
Checked By 7/22/57
Revised Date 9/1/57
C. M. HANSON

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ON OF CE BRAL DYNAMICS CORPORATION

SAN DIEGO, CALIFORNIA

Model XSAM-71

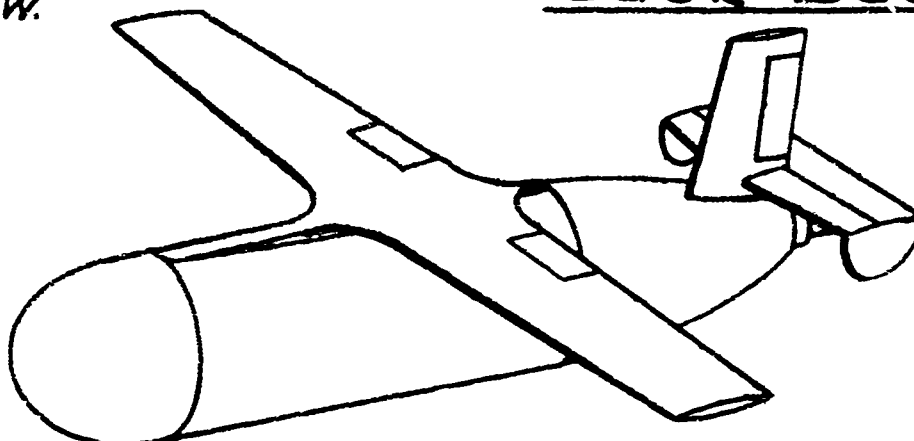
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Report No. ZM-486

SPONSOR: AIR FORCE

MFGR: CONVAIR-F.W.

BUCK DUCK



LENGTH: 13'

DIAMETER: 2.5'

SPAN: OPEN 14' FOLDED 5'

WEIGHT: 1550#

WARHEAD: NONE

GUIDANCE: AUTOMATIC CONTROL SYSTEM - SCHMIDT AUTO PILOT FOR STABILIZATION

PROPULSION: LIQUID MONO-PROPELLANT ROCKET, ETHYL-ISOPROPYL NITRATE - MAX. FUEL CAPACITY = 103.5 GAL, ONE XLPT-AJ-1 (AEROJET)

RANGE: 200 N.M.

VELOCITY: M = .55

ALTITUDE: 40,000 FT.

REMARKS: THIS IS A DECOY MISSILE, DESIGNED TO CONFUSE, DILUTE, SATURATE OR OTHERWISE DEGRADE A HOSTILE RADAR CONTROLLED AIR DEFENSE SYSTEM.

SECRET

REFERENCE: 6024-ND
Form 1277-C

Date 9/20/57
Prepared By CM HANSON
Checked By
Revised Date 7/27/57

CONVAIR
DIVISION OF GENERAL DYNAMIC CORPORATION
SAN DIEGO, CALIFORNIA
Model XASM-A-7

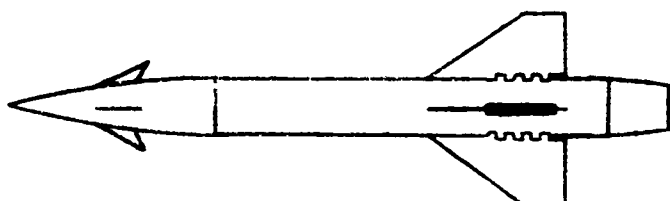
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Report No. ZM-186

SPONSOR: BLUED
MFGR: MARTIN

BULL PUP



LENGTH: 126"

DIAMETER: 12"

SPAN: 37.9"

WEIGHT: 541.1*

WARHEAD: AN-M57-GENERAL PURPOSE BOMB, WT: 254.0*; AL-M-81 FRAGMENTATION BOMB, WT: 258.0*; MK81 MOD 0 LOW DRAG BOMB, WT: 248.5*

GUIDANCE: VISUAL RADIO COMMAND

PROPULSION: SOLID PROPELLANT ROCKET (1.5XS-12000 AERQJET)

RANGE: 50 MI.

VELOCITY: M = 2

ALTITUDE: 22,000'

REMARKS: OPERATIONAL IN 1958 AIMED TO REDUCE ATTRITION OF DIVE BOMBERS DUE TO SMALL ARMS FIRE.

REFERENCE: CONVAIR TM 339-42-2 SEPT. 1956

Form 1277-C

Date 7-SEPT. 56

Prepared By DITMAPS

Checked By

Revised Date 9/11/57
C.M. HANSON

CONVAIR

A DIVISION OF GENERAL DYNAMICS CORPORATION

SAN DIEGO, CALIFORNIA

Model. D-40

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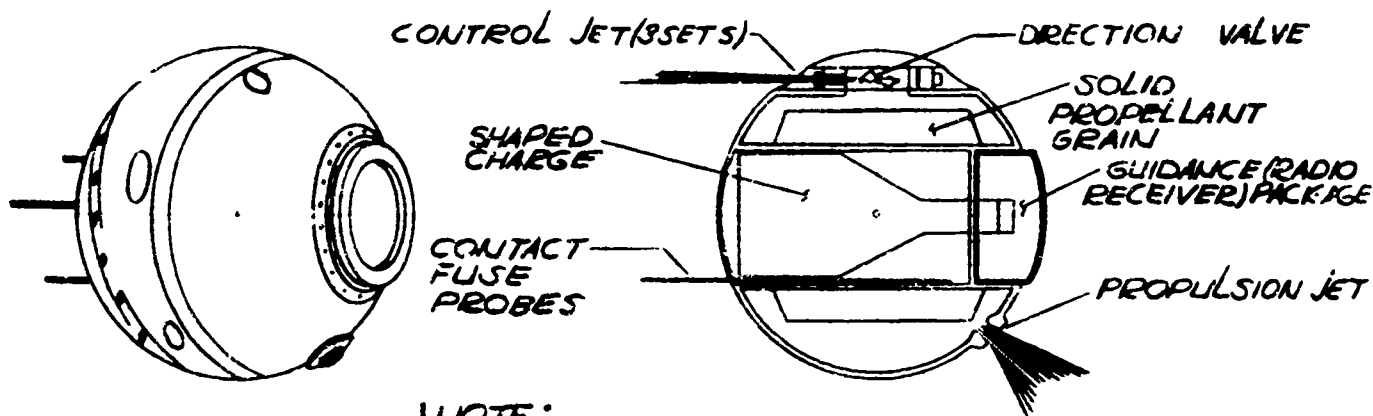
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Report No. ZM-486

SPONSOR: BUORD (JHU)

MFGR:

CANNON BALL



LENGTH:

DIAMETER. 19.75"

SPAN:

WEIGHT: 170#

WARHEAD:

6.5" PLASTIC CHARGE OR 50" SHAPED-CHARGE TYPE WARHEAD.

GUIDANCE:

AUXILIARY JETS- RADIO DIRECTED

PROPULSION

SOLID ROCKET

RANGE

3,000 YDS.

VELOCITY:

350 FT/SEC.

ALTITUDE:

SEA LEVEL

REMARKS:

28 FLIGHT TESTS OF D-40-2 AIR TANK PROTOTYPE MISSILES HAVE BEEN MADE TO DATE.

15 FLIGHT TESTS OF D-40-3 UNDERWATER PROTOTYPE MISSILES HAVE BEEN MADE TO DATE.

SECRET

REFERENCE.

(JHU) BUMBLEBEE SERIES RPT #262 (DEC. 1956)

Form 1277-C

Date 6 MAY '54
Prepared By DITMARS
Checked By
Revised Date 3/15/57
C.M. HANSON

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A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA
Model JSM-A-17

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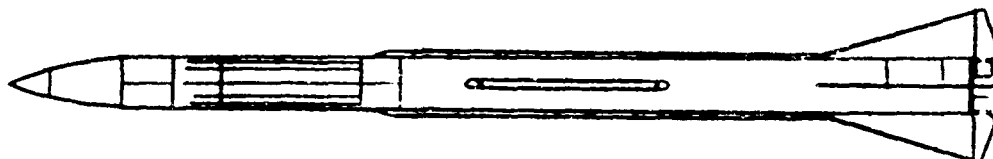
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Temp Penn

Report No. EM-486

SPONSOR: ARMY ORD.
MFGR: FIRESTONE - GIL FILLAN

CORPORAL



LENGTH: 45'
DIAMETER: 30"
SPAN: 80" (EST)
WEIGHT: 11,000#
WARHEAD: 1500#
GUIDANCE: X-BAND FLIGHT RADAR, INERTIAL RADIO
PROPULSION: LIQUID PROP. ROCKET. THRUST = 20,000# (IEFUA, LDMH) MFD. BY RYAN.
RANGE: 30 TO 80 MI.
VELOCITY: M = 3.8
ALTITUDE: 22-26 MI. PEAK
REMARKS: VTO FROM SPECIAL CRADLE. JET VANES IN ROCKET EXHAUST FOR LOW SPEED CONTROL. DEVELOPED FROM JPL-CAL TECH CORPORAL E. ARTILLERY BOMBARDMENT MISSILE.

REFERENCE: JPL GINS #30 (037661) CORPORAL BIMONTHLY SUMMARY RPT. #39A.
Form 1277-C

Date 4/15/57
Prepared By E. M. HANSON
Checked By
Revised Date 7/22/57
CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO CALIFORNIA
Model XASM-A1-B

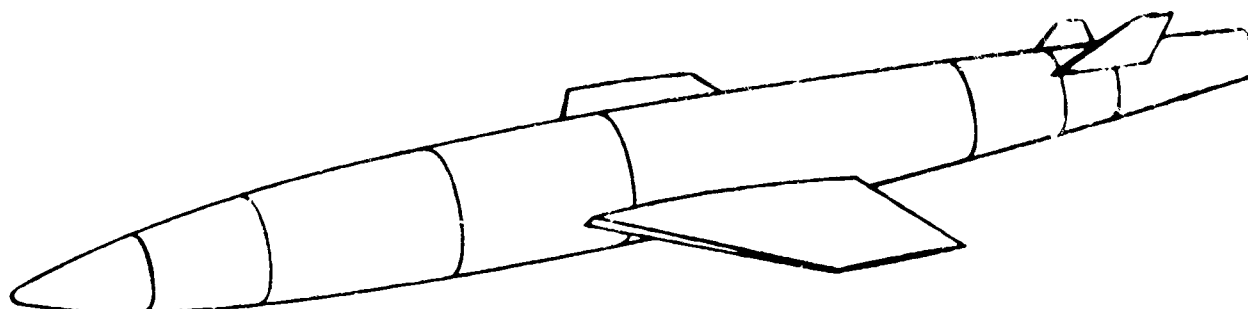
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Form

Report No 2 M-406

SPONSOR: NAVY

MFGR: TEMCO

CONVULS



LENGTH: 192"

DIAMETER: 18", 20"

SPAN: 60"

WEIGHT: 1599²

WARHEAD: XN-25 (NUCLEAR, 230² (EST.))

GUIDANCE: PASSIVE HOMING-RANGE, 170 MI AGAINST RADIATING TARGETS, 100 MI. AGAINST ILLUMINATED TARGETS

PROPULSION: LIQUID (OXIDIZER = HYD. PROX., FUEL - JP. 5)
THRUST 1000² DURATION 185 SEC.

RANGE

VELOCITY: M=3.75 WHEN AIR LAUNCHED @ 40,000'

ALTITUDE: SEMI-BALLISTIC PATH-BURGLUT @ 70,000'

REMARKS: RADAR BLISTER WEAPON

SECRET

REFERENCE
Form 1277 C

TRIP REPT. CR. TUTTLE (10 JUNE '57)
NAVY, TS-149 (19 FEB., 1957)

Date 3/15/57

Prepared By C.M. HANSON

Checked By

Revised Date

CONVAIR SECRET

A DIVISION OF GENERAL DYNAMICS CORPORATION

SAN DIEGO, CALIFORNIA

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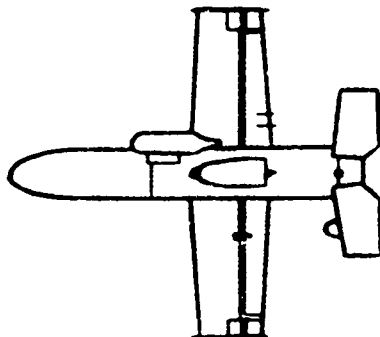
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Report No. ZM-468

SPONSOR: ARMY

MFGR. AEROPHYSICS DEVELOPMENT CORPN.

DART



LENGTH. 69"

DIAMETER: 8.5

SPAN: 34" INTERDIGITATED CRUCIFORM

WEIGHT: 85¹

WARHEAD. 80²

GUIDANCE: COMMAND (WIRE-GUIDED)

PROPULSION SOLID PROPELLANT ROCKET, 1:88/49-3-MS-616/639,
XM-23

RANGE: 3 N.MI.

VELOCITY. M = .3

ALTITUDE. GROUND LEVEL

REMARKS WIRE GUIDED ANTI-TANK WEAPON
BASED ON FRENCH AND GERMAN
CONCEPTS. MAY BE LAUNCHED FROM
A JEEP.

SECRET

REFERENCE. CONVAIR TM 339-42-2

Form 1277-C

Date 2/26/57
Prepared By C. M. HANSON
Checked By
Revised Date

CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA
Model AAM/ASM

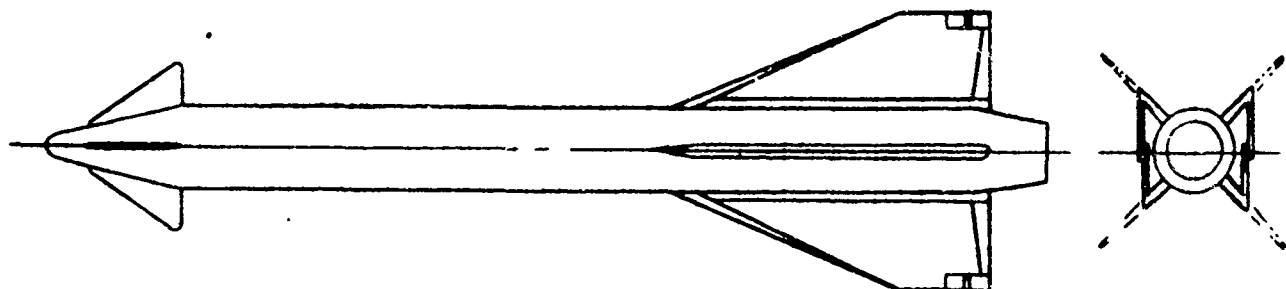
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Report No ZM 486

SPONSOR: NOTS

MFGR:

DIAMONDBACK



LENGTH: 148"

DIAMETER: 12"

SPAN: CANARD 22", WING: OPEN 40", CLOSED 22"

WEIGHT: 850*

WARHEAD: EITHER HIGH-LETHALITY CONTINUOUS-ROD HIGH-EXPLOSIVE W.H. OR LOW-YIELD (0.75 KT) ATOMIC W.H., W.H. = 172*

GUIDANCE: IR & PASSIVE RADAR HOMING

PROPULSION: LIQUID ROCKET PROPELLANT: UDMH/RFNA

RANGE: TAIL ATTACKS @ RANGES of 15-20 MI FROM ALTITUDES OF 20,000'-70,000.'

VELOCITY: CRUISE @ MACH 3.0 ABOVE 35,000.'

ALTITUDE: DESIGN FOR 80,000' MAX.

REMARKS: STATUS; OPERATIONAL 1960*

SECRET

REFERENCE: NOTS REPORT 1504 (7-2-56)
Form 1277-C * TRIP REPORT: ALLPORT, LA FORCE & LEGUE DATED 7-30-56

Date 6/19/57
Prepared By C. M. VANSON
Checked By
Revised Date
ONV AIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA
Model

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Report No. ZNI-486

DIAMONDBACK

PROPELLSION

PROPELLANTS = UNSYMMETRICAL DIMETHYL
HYDRAZINE AND RED FUMING NITRIC ACID.
WEIGHT OF PROPELLANTS = 372#
 $I_{sp} = 292 \text{ LB-SEC/LB.}$
CHAMBER PRESSURE (BOOST PHASE) = 1800 P.S.I.
OVERALL THRUST RATIO OF THE SUSTAIN-
ER AND BOOSTER COMBINATION IS 33.3 TO
1 (10,000 LB / 300 LB).

SECRET

REF: NOTES 1504 (13871)

Date 10 SEPT 1956
Prepared By CHALK
Checked By
Revised Date 3/7/57
GM. HANSON

CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA
Model MB-1

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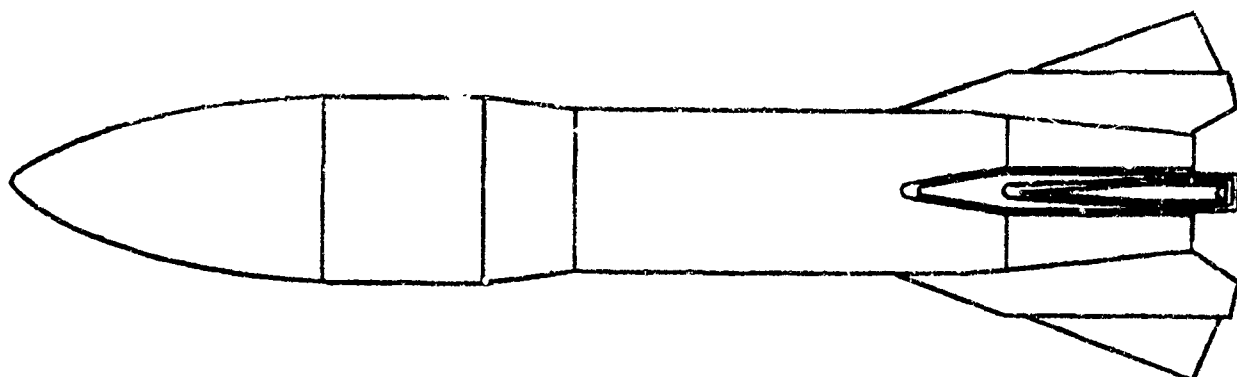
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Temp Penn

Report No. ZM-486

SPONSOR: AIR FORCE
MFGR: DOUGLAS

DING-DONG



LENGTH: 115"

DIAMETER: 17.35" (MAX), BODY 15"

SPAN: EXTENDED = 39.5" RETRACTED = 28.5"

WEIGHT: $W_0 = 812^{\#}$ $W_6 = 488^{\#}$

WARHEAD: 230[#] XW-25

GUIDANCE: UNGUIDED (AIMED BY LAUNCHING A/C FIRE CONTROL)

PROPULSION: SOLID ROCKET AJB-2KS-36, 250

RANGE: 5 MI. @ HIGH ALT. - 3 MI. @ LOW ALT.

VELOCITY: 3,000 FT/SEC. ADDED TO THAT OF LAUNCHING AIRCRAFT.

ALTITUDE: 65,000' (MAX.)

REMARKS: FOR INSTALLATION ABOARD ALL-WEATHER INTERCEPTOR AIRCRAFT. (F102C - F106)

SECRET

REFERENCE.
Form 1277-C

DOUGLAS AC. J5591129, RPT # SM-27125 (8-1-56)

Date 4/22/57
Prepared By M. HANSON
Checked By
Revised Date

CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA
Model: MB-L

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Temp Penn

Report No. ZM-486

DING-DONG

$$W_0 = 812^{\#}$$

$$W_e = 488^{\#}$$

$$\mu = 1.66$$

$$l_{\mu} = 507$$

$$L = 114.9$$

$$d_{w4} = 17.35$$

$$d_b = 15" (15.5" \text{ OVER HEATING BLANKET})$$

$$R(\text{LOW ALT.}) = 15,000'$$

$$R(\text{HIGH ALT.}) = 30,000'$$

$$\text{SPAN (EXT.)} = 39.5"$$

$$\text{SPAN (FOLDED)} = 22.5"$$

$$A_F = 218 \text{ IN}^2 / \text{PANEL}$$

Date 4/28/57

Prepared By C. M. HANSON

Checked By

Revised Date

CONVAIR

A DIVISION OF GENERAL DYNAMICS CORPORATION

SAN DIEGO, CALIFORNIA

Model MB-1

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Penn

Report No. ZM-486

DING-DONG

MOTOR 2KS-36, 250, E1

$l_{oa} = 66.5"$

$l_{ch} = 46.81"$

$D_e = 11.875"$

$D_c = 15.0" \pm .015" (OD)$

$W_{CH} = 120^{\#}$

$W_{NOZ} = 48^{\#}$

$W_{LINER} = 5^{\#}$

$W_{IGN} = 3^{\#}$

$a_{max} = 100g$ (28g NORMAL)

$W_p = 324^{\#}$

$C^* = 4730 \text{ '}/\text{SEC}$

$T_c = 4600^{\circ}F$

Date 4/22/57

Prepared By CHANSON

Checked By

Revised Date

CONVAIR

A DIVISION OF GENERAL DYNAMICS CORPORATION

SAN DIEGO, CALIFORNIA

Model 118-1

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Fenn

Report No. ZM-486

DING-DONG

WARHEAD POWER REQUIREMENTS:

FLUSE: TOTAL POWER SUPPLY VOLTAGE =
400V, DC ± 28 V

FILAMENT VOLTAGE (AC RMS OR DC) =
12.6V $\pm 5\%$

ARM: 20V, DC CATALYST RESEARCH CORP.
B-415 THERMAL BATTERY

FIRE: OUTPUT OF 4 MICROFARAD CAPACITOR
CHARGED TO 200 V MIN. THRU 2
TYPE 5643 SUB-MINIATURE THYRATrons
IN SERIES.

FLUSE WEIGHT: 24 #

Date 28 OCT '53
 Prepared By DITHMPS
 Checked By 2/23/57
 Revised Date 3/5/57
 C.M. HANSON

CONVAIR
 A DIVISION OF GENERAL DYNAMICS CORPORATION
 SAN DIEGO, CALIFORNIA
 Model GAR-1, 1A, 1B

SECRET

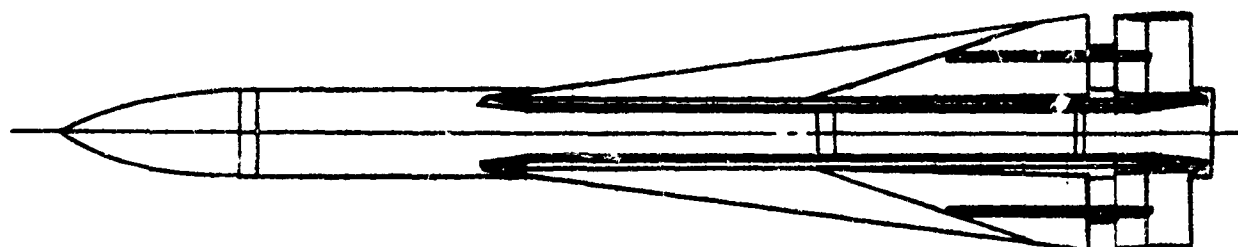
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Report No. ZM-486

SPONSOR: USAF

MFGR: HUGHES AIRCRAFT CORP

FALCON



	GAR-1	GAR-1A	GAR-1B
LENGTH:	77.84'	86.5'	77.84'
DIAMETER:	6.4"	6.4"	6.4"
SPAN:	20'	24'	20'
WEIGHT:	124 [±]	135 [±]	124 [±]
WARHEAD:	8"	5" HBX CONTACT	8"
GUIDANCE:	SEMI ACTIVE PULSE	RADAR HOMING	INFRA-RED
PROPULSION:	5560 [±] /1.2 SEC	4500 [±] /0.6 SEC 700-0 [±] /3.0 SEC	5560 [±] /1.2 SEC.
RANGE:	5,000'-25,000'	5,000'-25,000'	5,000'-25,000'
VELOCITY:	2,000 FT/SEC + LAUNCH	2,000 FT/SEC + LAUNCH	2,000 FT/SEC + LAUNCH
ALTITUDE:	50,000'	70,000'	50,000'

REMARKS: SKETCH ABOVE IS OF GAR-1A, GAR-1B IS SAME AIRFRAME AS GAR-1 WITH INFRA RED GUIDANCE.
 ~595 @ BUZZOUT

SECRET

REFERENCE: PR 40-28P 4th QUARTER 52 (HAC)
 Form 1277-C

Date 3/6/57

Prepared By CM. HANSON

Checked By

Revised Date

CONVAIR

DIVISION OF GENERAL DYNAMICS CORPORATION

SAN DIEGO, CALIFORNIA

Model SAE-1C

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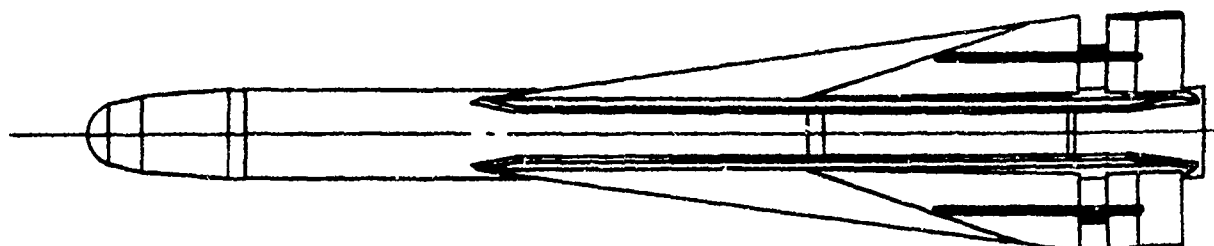
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Report No. ZM-486

SPONSOR: USAF

MFGR: HUGHES AIRCRAFT CORP

FALCON



LENGTH. 83.4"

DIAMETER: 6.4"

SPAN: 24"

WEIGHT: 135#

WARHEAD: 5[#] HBX CONTACT

GUIDANCE: INFRA-RED

PROPULSION: 4500[#]/0.6 SEC , 700[#]-0[#]/3.0 SEC.

RANGE: 3500' TO 35,000'

VELOCITY: 1200'/SEC + LAUNCH

ALTITUDE: 70,000'

REMARKS:

SECRET

REFERENCE
Form 1277-C

206-54 , 6591-55

Date 10 SEPT. 1956

Prepared By CHALK

Checked By

Revised Date 3/18/57
C.M. HANSON

CONVAIR

A DIVISION OF GENERAL DYNAMICS CORPORATION

SAN DIEGO, CALIFORNIA

Model GAE-1 (T-42)

Page

Temp

Fenn

Report No. ZM-486

SPONSOR: U.S.A.F.
MFR: HUGHES

FALCON ROCKET MOTOR

NOZZLE EXPANSION RATIO $\frac{A_e}{A_t} = 8.27$

DIA. OF EXIT

$D_e = 4.79"$

PROPELLANT SPECIFIC IMP. $I_{sp} = 194 @ SL 60-70^\circ F$

ADIABATIC FLAME TEMP $T_c = 3990^\circ F @ 1,000 PSI$

CHAMBER PRESSURE $P_c = 1370 PSIA$

TOTAL IMPULSE $I = 6690 LB-SEC.$

DURATION, 1.36 SEC.

IMPULSE/WEIGHT RATIO $I/W = 157 SEC.$

PROPELLANT TYPE - POLY SULFIDE-TIOE2
OXIDIZER (SIMILAR TO JPL-100L)

REMARKS: ADDITIONAL INFO. IN TECH. MANUAL-
#270, HUGHES A. C. ON T47 ROCKET
MOTOR.

REFERENCE: CONVERSATION WITH HOWARD
BELMONT 3-31-55 & CALL TO HUGHES A.C. TEXAS
0-7111 EXT. 3629

SECRET

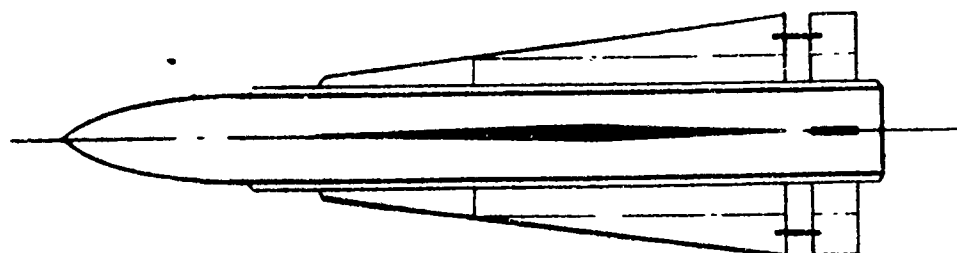
Date SEPT. 7, 1956 **CONVAIR**
Prepared By CHALK A DIVISION OF GENERAL DYNAMICS CORPORATION
Checked By E. M. DANSON SAN DIEGO, CALIFORNIA
Revised Date 8/15/57 Model 4AM

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Temp Penn

Report No ZM-486

SPONSOR A. F.
MEGR HUGHES

GAR-X



LENGTH. 134.5"
DIAMETER. 12.75"
SPAN. 41" (FOLDED 15.25)
WEIGHT 619# (W_E = 466.5)
WARHEAD. 125#
GUIDANCE PASSIVE RADAR/IR
PROPULSION SOLID ROCKET
RANGE
VELOCITY: 38 INCLUDED IS VELOCITY OF LAUNCHER.
ALTITUDE 75,000' LAUNCHED @ 55,000'
REMARKS ALL WORK STOPPED AUG, 31 '56 EXCEPT FURTHER STUDY.

SECRET

REFERENCE
Form 1277-C

SWC-65-21, 442/72 3 AUGUST 1956

Date 7/24/57

Prepared By E.M. HANSON

Checked By

Revised Date

CONVAIR

A DIVISION OF GENERAL DYNAMICS CORPORATION

SAN DIEGO, CALIFORNIA

Model SAM

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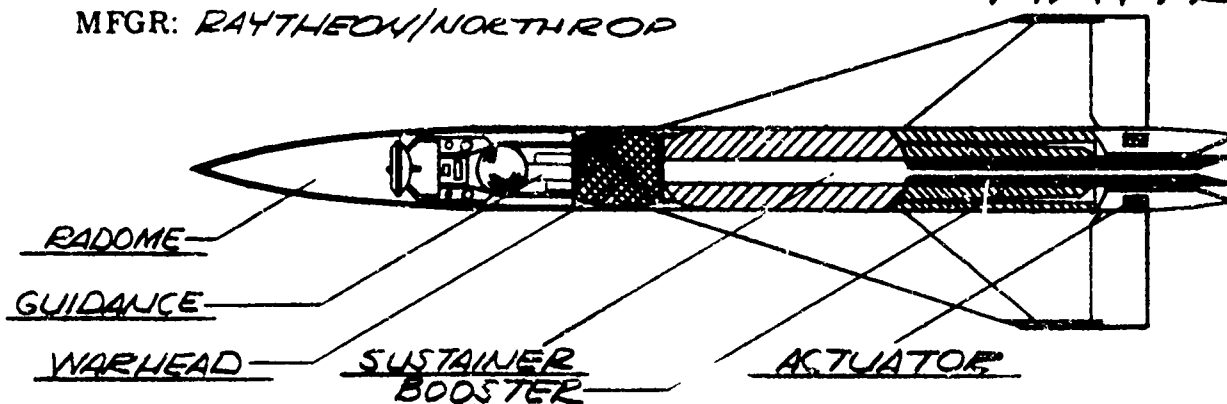
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Report No. ZM-486

SPONSOR: USARMY

MFGR: RAYTHEON/NORTHROP

HAWK I



LENGTH 195.6"

DIAMETER. 14.0"

SPAN: 47.4"

WEIGHT: 1266*

WARHEAD. (SECTION) 120# C-E WARHEAD

GUIDANCE. CW SEMIACTIVE HOMING SYSTEM OF THE TYPE USED IN SPARROW III.

PROPULSION SOLID PROPELLANT ROCKET, 5.0/27.0 KS-15,000/2000 (AEROJET)

RANGE: APPROX. 19 N.MI.

VELOCITY: M=20

ALTITUDE. DESIGNED TO DEFEND AGAINST LOW-LEVEL AIR ATTACKS.

REMARKS HAWK I IS AN ANTIAIRCRAFT GUIDED MISSILE SYSTEM, USING SUPERSONIC HOMING MISSILES, WITH THE ABILITY TO DEFEND FORWARD AREAS AGAINST LOW-ALTITUDE AIR ATTACKS

REFERENCE.

Form 1277-C

(16102) JAN-MAR, 56"

SECRET

Date 7/25/57
Prepared By CARL KALSON
Checked By
Revised Date

CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA
Model SAM

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Temp Penn
Report No. ZM 486

HAWK I

PROPUSSION

DUAL-CHAMBER (HF-D) MOTOR

	SUSTAINER	BOOSTER
PROPELLANT WT. (LBS.)	316	308
IMPULSE (LB-SEC)	58,900	67,500
BURNING TIME (SEC)	31	4.5
THRUST (AVG., LBS.)	1900	15000
AVG. OPERATING PRESSURE (LBS./IN ²)	750	1500

REF: 116109)

... SURE:

Date 12 MAY 54
Prepared By DITHMARS
Checked By
Revised Date 5/5/57
G.M. HANSON

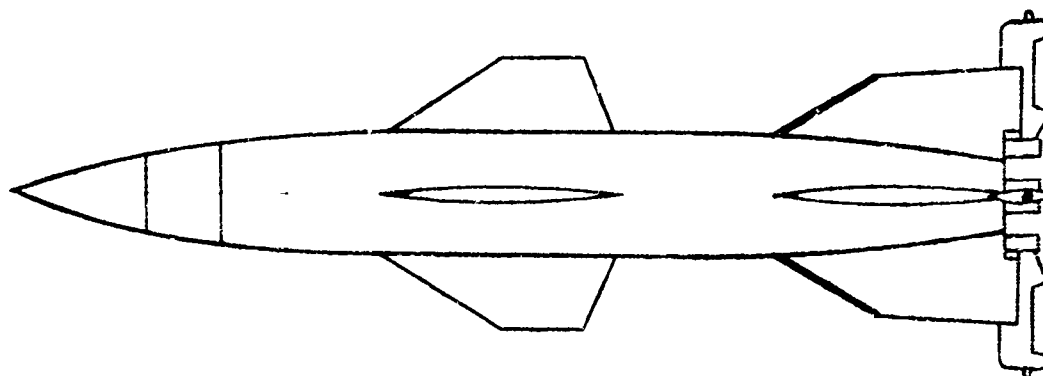
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A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA
Model A-1E1 (RV-A-5)

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Terr. Penn

Report No. ZM-486

SPONSOR: ARMYFORD
MFGR: GENERAL ELECTRIC

HERMES



LENGTH: 305 $\frac{1}{32}$ "

DIAMETER: 34 $\frac{5}{8}$ "

SPAN: 99 $\frac{1}{8}$ "

WEIGHT: 8858 #

WARHEAD: 1450 #

GUIDANCE: COMMAND GUIDANCE SYSTEM: MPQ-12 CONICAL SCAN
RADAR & MISSILE-BORNE COMMAND UNIT.

PROPULSION: LIQUID ROCKET (ALCOHOL-LOX)

RANGE: 245,000'

VELOCITY: M=4.0

ALTITUDE: 90,000'

REMARKS: PROGRAM CANCELLED

REFERENCE: 6514-54 FINAL RPT. RV-A-5 (MAR 54)
Form 1277-C

Date 9/15/57
Prepared By C.M. HANSON
Checked By
Revised Date

CONVAIR
A DIVISION OF CENTRAL AIRCRAFT CORPORATION
SAN DIEGO, CALIFORNIA
Model S.S.M.

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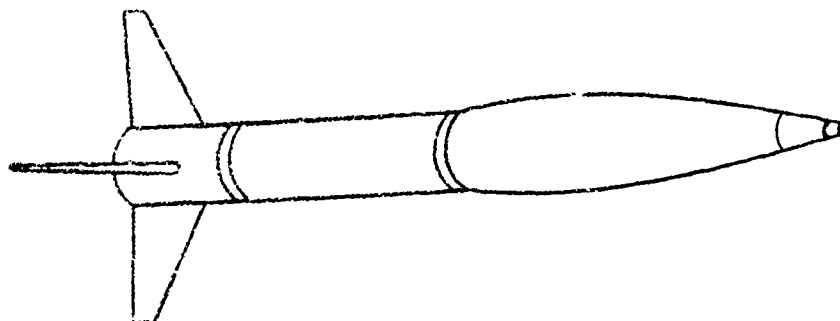
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Report No. ZM-486

SPONSOR: ARMY
MFGE: DOUGLAS

HONEST JOHN



LENGTH 400"

DIAMETER. 30" @ WARHEAD, 23" ALONG BODY

SPAN: 8'

WEIGHT: 10,000 #

WARHEAD: 1500 #

GUIDANCE: NO GUIDANCE, IT IS SPIN-STABILIZED BY (4) M-7 ROCKETS.

PROPULSION. SOLID PROPELLANT ROCKET, $W_p = 218 \text{ lb}$, $T = 83,000 \text{ lb}$
 $T_b = 4.4 \text{ SEC. (4DS-105,000)}$

RANGE. 25 N. MI.

VELOCITY: $M = 1.5$

ALTITUDE: 30,000'

REMARKS. OVER 600 POUNDS HAVE BEEN FIRED.

SECRET

REFERENCE CONVAIR TM-359-42-2
Form 1277-C

SECRET

Date 3/22/57
Prepared By W. HANSON CONVAIR
Checked By
Revised Date 7/29/57 A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA
Model LEBN

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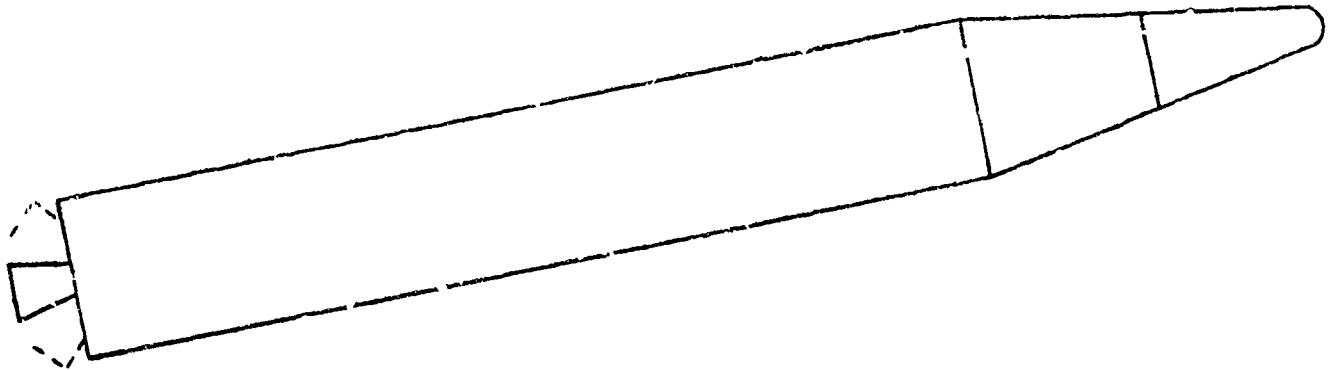
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Temp Penn

Report No. ZM-486

SPONSOR: ARMY
MFGR: CHRYSLER

JUPITER



LENGTH: 58'

DIAMETER: 105"

SPAN: NONE

WEIGHT: TAKE-OFF WT - 110,000#

WAIL HEAD: 1500#

GUIDANCE: INERTIAL (MFG. BY FORD INSTRUMENT CO.)

PROPULSION: GIMBAL MOUNTED, U. AMER. NAA 150-800-SSD
ROCKET ENGINE PROP. - JP-5 KEROSENE FLOX.
BURNING TIME - 160-165 SEC. THRUST - 142,000#

RANGE: 1500 N. MI.

VELOCITY: 15,000-16,000'/SEC. 20 VELOCITY.

ALTITUDE: PEAK - 950 MI. (APPROX)

REMARKS: OPERATIONAL IN LATE 1960. CIRCULAR PROB-
ABLE ERROR OF 15,000 YDS. WILL BE EVALUATED
AGAINST THOR FOR AIR FORCE USE

REFERENCE: 16028, 15899
Form 1277-C

SECRET

Date 9/22/57
Prepared By J. H. MANSON
Checked By
Revised Date 7/22/57
CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA
Model ICBM

SECRET

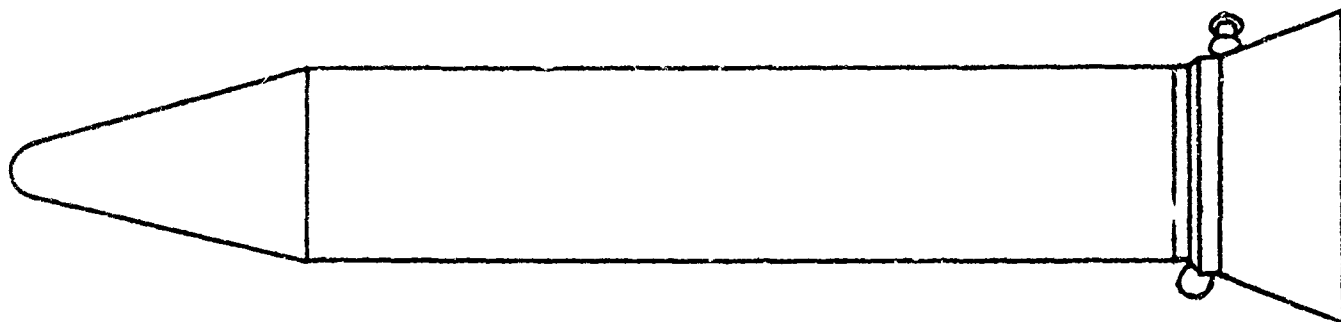
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Temp

Report No. 211-486

SPONSOR: U.S. NAVY
MFGR: CHRYSLER

JUPITER



LENGTH: 58'

DIAMETER: 105"

SPAN: NONE

WEIGHT: TAKE-OFF WT.: 103,080⁺

WARHEAD: 1500⁺

GUIDANCE: INERTIAL (MEG. BY REDSTONE)

PROPULSION: SOLID PROPELLANT ROCKET (AEROJET) GUIDED
MOUNTED IN AER. NAA RD-20-530 ROCKET ENGINE, PROP. 1P-5
PEROXIDE. MAX. BURNING TIME: 160-165 SEC. THRUST: 142,000⁺ LBS.

RANGE: 1500 N.M.I.

VELOCITY: 1500-1600'/SEC. B.O. VELOCITY

ALTITUDE:

REMARKS: OPERATIONAL IN LATS 1960. FLEET BALLISTIC
MISSILE DESIGNED FOR SHIPBOARD & SUBMARINE
LAUNCHING. CIRCULAR PROBABLE ERROR OF
15,000 YDS.

SECRET

REFERENCE: CONVAIR: TM 334-42-2, & 16089
Form 1277-C

Date 4/28/57

Prepared By C. MANWSON

Checked By

Revised Date

C O N V A I R

A DIVISION OF GENERAL DYNAMIC CORPORATION

SAN DIEGO, CALIFORNIA

Model IRBM

SECRET

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Penn

Report No. JM-486

JUPITER

CONTROL

CONTROL OF THE MISSILE VELOCITY FOLLOWING THE SEPARATION OF BODY FROM THE THRUST UNIT, SUBSEQUENT TO CUTOFF OF THE MAIN BOOST ENGINE, IS PROVIDED BY TWO HINGE-MOUNTED VERNIER THRUST UNITS HOUSED IN THE AFT SECTION OF THE BODY. ATTITUDE AND ROLL CONTROL OF THE BODY, AFTER SEPARATION DURING FLIGHT ABOVE THE SENSIBLE ATMOSPHERE, IS MAINTAINED BY A SERIES OF EIGHT HIGH-PRESSURE HELIUM JET NOZZLES.

GUIDANCE

THE INERTIAL GUIDANCE SYSTEM IS HOUSED IN THE BODY. A TILT PROGRAM SERVES TO KEEP THE LONGITUDINAL AXIS OF THE BODY ALIGNED WITH THE FLIGHT PATH TANGENT. THE PREDICTED IMPACT POINT OF THE NOSE CONE IS CONTINUALLY CALCULATED BY THE RANGE GUIDANCE COMPUTER. AT THE PROPER TIME, FINAL CUTOFF IS EFFECTED IN ORDER TO ACCOMPLISH IMPACT AT THE DESIRED POINT. UPON REENTRY INTO THE ATMOSPHERE, THE HEAT-PROTECTED NOSE CONE IS SEPARATED FROM THE REST OF THE BODY AND CONTINUES IN AN UNCONTROLLED DIVE TO THE TARGET.

SECRET

REF: 15778, JUPITER MISSILE PROGRAM,
PR 3AR(CHRYSLER CORP. MISSILE OPERATIONS.

Date 9/22/57
Prepared By GMHANSON **CONVAIR**
Checked By
Revised Date
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA
Model JEBM

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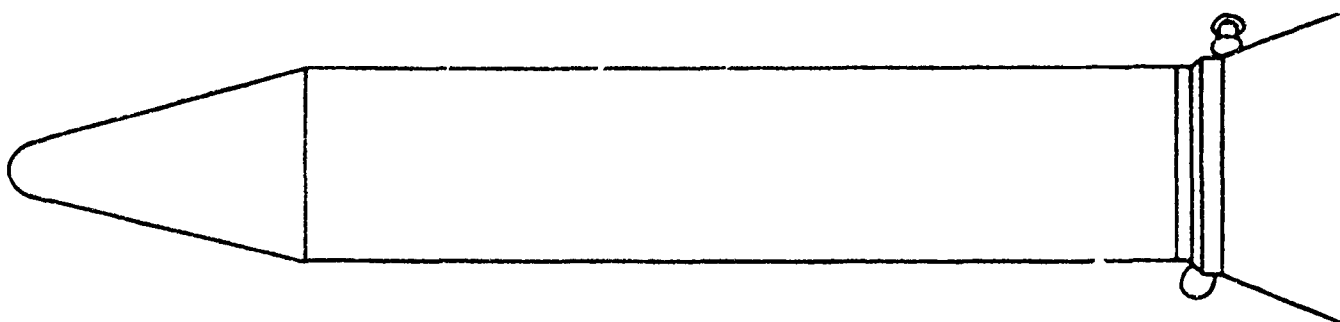
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Temp Penn

Report No. ZM-486

SPONSOR: US NAVY
MFGR: CHRYSLER

JUPITER-5



LENGTH. 684"

DIAMETER. 105"

SPAN.

WEIGHT. 175,000*

WARHEAD: 1500*

GUIDANCE. INERTIAL

PROPULSION. SOLID PROPELLANT ROCKET (AEROJET)

RANGE: 1500 N.MI.

VELOCITY:

ALTITUDE.

REMARKS. OPERATIONAL IN LATE 1960. FLEET BALLISTIC MISSILE DESIGNED FOR SHIPBOARD & SUBMARINE LAUNCHING.

SECRET

REFERENCE. CONVAIR: TM 339-42-2
Form 1277-C

Date 5-5-54

Prepared By DITMARPS

Checked By 7/2/57

Revised Date 6-26-56

C.M. HANSON

CONVAIR

A DIVISION OF GENERAL DYNAMICS CORPORATION

SAN DIEGO, CALIFORNIA

Model X5SM-A-12

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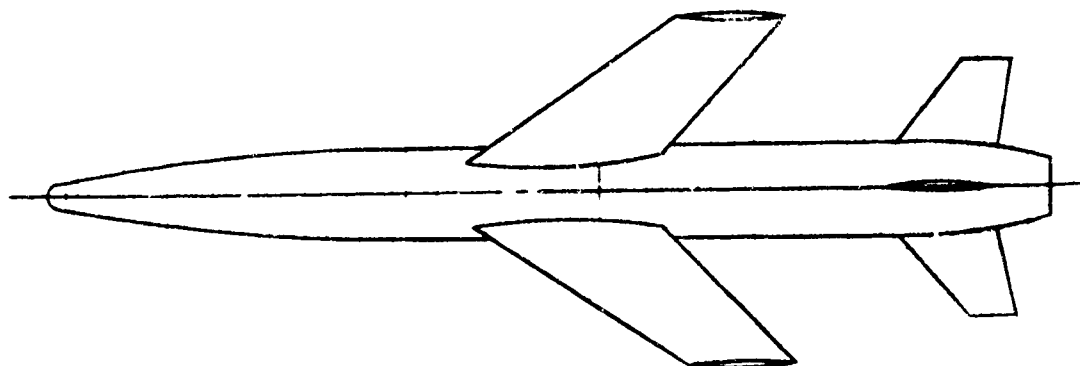
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Report No. ZM-486

SPONSOR: ARMY

MFGR: MARTIN

LACROSSE



LENGTH: 230" (19'2")

DIAMETER: BODY = 20.5" BASE = 14"

SPAN: WING = 108" TAIL = 36.5" INTERDIGITATED
CRUCIFORM

WEIGHT: 2300# LAUNCH 1645# BURN-OUT

WARHEAD: 500#

GUIDANCE: MID-COURSE, LAUNCH SITE COMMAND-TERMINAL,
COMMAND FROM FWD. POSITION (1000 YDS FROM TARGET)

PROPULSION: SOLID PROPROCKET 3 ES: 97000

RANGE: 11.8 N.MI.

VELOCITY: 1500'/SEC

ALTITUDE: 5000'

REMARKS:

DESIGNED FOR CLOSE SUPPORT OF GROUND
TROOPS - CORNELL AERO. LAB IS ACTING AS THE
CENTRAL CONTRACTING AGENCY AND IS RE-
SPONSIBLE FOR DESIGN. SPIN OF 400°/SEC.
IMPARTED BY LAUNCHER. BALLISTIC, WINGLESS
CONFIGURATION IS IN DEVELOPMENT.

SECRET

REFERENCE:
Form 1277-C

APL/SHU-TG-60-12 (6 NOV. '52)

Date 6/12/57
Prepared By CM HALSON
Checked By
Revised Date
CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA
Model

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Temp

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 Penn

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Report No. ZM-486

LACROSSE

PROPULSION UNIT (30ES-3200, 752)

LENGTH (OVERALL) = 101.02 IN.

DIAMETER (MAX) = 17.27 IN.

WEIGHT:

LOADED = 846 #

EXPENDED = 341 #

TIME OF BURN (t_b @ 70°F) = 3.00 SEC.

THRUST = 34,250 #

IMPULSE = 97,610 # SEC.

POET-TO-THROAT RATIO, $1/J = 3.5$

NOZZLE EXPANSION CONE ANGLE = 25°

NOZZLE THROAT DIA. = 5.00 IN.

NOZZLE EXIT DIA. = 17.26 IN.

REF: JATO MANUAL.

Date 5/25/57
Prepared By C.M. HANSON
Checked By
Revised Date

C O N V A I R
A DIVISION OF GENE DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA
Model LCM

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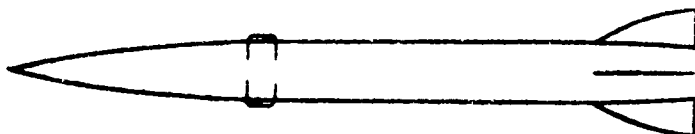
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Temp Penn

Report No. ZM-486

SPONSOR: ARMY
MFGR: DOUGLAS

LITTLE JOHN-XM47



LENGTH: 12'

DIAMETER: 12.5"

SPAN: 30"

WEIGHT: 980^{lb}

WARHEAD: NUCLEAR

GUIDANCE:

PROPULSION: SOLID PROPELLANT ROCKET MOTOR (ABL)

RANGE: 18,000 YDS.

VELOCITY:

ALTITUDE:

REMARKS: SPIN STABILIZED TO CANCEL THRUST MISALIGNMENT. SCALED DOWN HOMERST JOHN. FINS ARE MOVABLE AND EQUIPPED FOR FLARES.

SECRET

REFERENCE
Form 1277-C

FLIGHT, 7 DEC. 1956

Date 5/16/57
Prepared By C.M. HANSON
Checked By
Revised Date
CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA
Model XSAM

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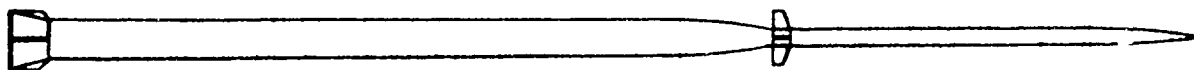
Penn

Report No. ZM-486

SPONSOR: ARMY

MFGR. BENDIX AVIATION CORP.

LOKI



LENGTH BOOSTER - 61.5", MISSILE - 34"
DIAMETER. BOOSTER - 3.00, MISSILE - 1.3"
SPAN. 4"
WEIGHT 24.40^{lb}
WARHEAD. 5.5"
GUIDANCE NONE
PROPULSION LIQUID ROCKET (BOOST) SOLID ROCKET (END STAGE)
OBBS-3850 (INTERIM)
RANGE
VELOCITY 4500 FT/SEC.
ALTITUDE 84,000'
REMARKS ANTI-AIRCRAFT ROCKET.

SECRET

REFERENCE
Form 1277-C

BENDIX RPT #55-801 (NOV. 26, 1948)

Date 4/MAY/54
Prepared By DITMARS

CONVAIR

A DIVISION OF GENERAL DYNAMICS CORPORATION

Checked By

Revised Date C. HANSON
2/11/57

SAN DIEGO, CALIFORNIA

Model SSM

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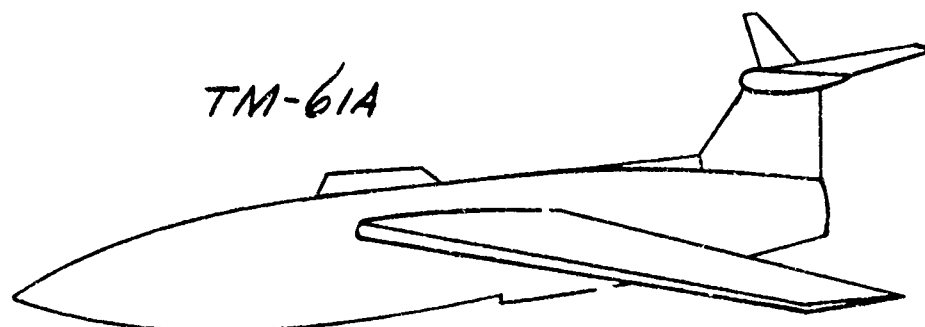
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Report No. ZM-486

SPONSOR: AIR FORCE

MFGR: MARTIN

MATADOR



LENGTH: 180" (39.6')

DIAMETER: 54"

SPAN: 336" (28.7')

WEIGHT: 11,467^{lb}

WARHEAD: 3050^{lb} (BLAST, ATOMIC OR CHEMICAL)

GUIDANCE: COMMAND CONTROL AND SHANICLE HYPERBOLIC NAVIG. SYSTEM... SEMI-BALLISTIC DIVE-IN.

PROPULSION: J-33-A-37 TURBO-JET (CRUISE) 2.4 ES-57,000 (T-50) ROCKET (BOOST)

RANGE: 650 MI. LAUNCH TO TARGET

VELOCITY: HIGH SUBSONIC

ALTITUDE: 45,000' APPROX.

REMARKS: B-61A CURRENT PRODUCTION RATE-18/MO.

SECRET

REFERENCE:
Form 1277-C

APL/JHU TG-60-15 (2-15-54)

Date 30 APRIL 54
Prepared By DITMARS

Checked By

Revised Date 2-20-57

C.M. HANSON

CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION

SAN DIEGO, CALIFORNIA

Model SM-64 (G-26)

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Penn

Report No. ZM-486

SPONSOR: AIR FORCE

MFGR: NORTH AMERICAN

NAVAHO-II



LENGTH: 815"

DIAMETER: 68"

SPAN: 348"

WEIGHT: 65,000[#], BOOSTER=69,600[#] (GROSS=134,600[#])

WARHEAD: MK IV (NOT DEFINITE)

GUIDANCE: INERTIAL AUTO NAVIGATION

PROPULSION: CRUISE-2 WRIGHT 48" DIA. RAM JETS
BOOST-2 NO. AMER. 120,000[#] LOX-ALC. ROCKETS (ALR-43-NA-3)

RANGE: B-64=3600 N.MI. B-64A=5500 N.MI.

VELOCITY: M=2.75

ALTITUDE: START OF CRUISE=57,000' FINAL=77,500'

REMARKS: XB-64 PROTOTYPE SCHEDULED FOR FIRST
FLIGHT OCT '54. X10 FLIGHT TEST VEHICLES
NOW FLYING. (2 X1-40 ENGINES, M=1.8)

SECRET

REFERENCE:
Form 1277-C

AL-1575 NAVAHO P.R.#38 JAN'53 & PREVIOUS

Date 30 APRIL '54 CONVAIR

Prepared By DITMAPS A DIVISION OF GENERAL DYNAMICS CORPORATION

Checked By

Revised Date 3/11/57

C. M. HANSON

SAN DIEGO, CALIFORNIA

Model SM-64-A (G-38)

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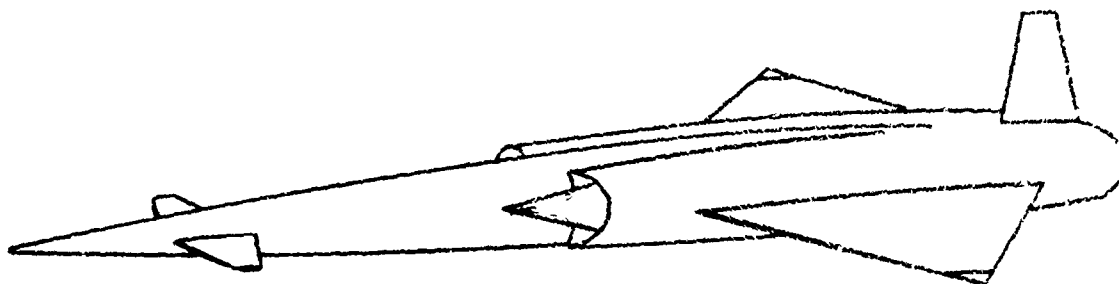
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Report No. ZM-486

SPONSOR: AIR FORCE

MFGR: NORTH AMERICAN

NAVAHO III



LENGTH: 1048" BOOSTER 1098"

DIAMETER: 78" BOOSTER 92.85"

SPAN: 482" WING AREA 750.7 FT.²

WEIGHT: BEGIN CRUISE = 120,500[#] END CRUISE = 38,300[#]
BOOSTER-LAUNCH = 169,500[#] BURNOUT = 16,450[#]

WARHEAD: 15,000[#] - 4800 N.MI. RANGE, 7000[#] - 5500 N.MI. RANGE,
3,000[#] - 5820 N.MI. RANGE

GUIDANCE: INERTIAL AUTONAVIGATION (N6-B)

PROPULSION: BOOST - 3 NO. AMER. 135,000[#] LOX-ALC. ROCKETS,
(XLR-48-NA-3), CRUISE - 2 WRIGHT 48" DIA. RAM JETS.

RANGE: 5500 N.MI. - 7000[#] WARHEAD, 8000 N.MI. - 7000[#]
(HIGH ENERGY FUELS)

VELOCITY: M = 3.25 (CRUISE)

ALTITUDE: 57,400' (START CRUISE), 82,900' (END)

REMARKS: FWD. TRIMMER AREA = 52 FT.², VERTICAL = 40.1 FT.²
WT.-DRAG RATIO = 5.15. SUPPLEMENT PROPULSION:
TOTAL PRESSURE RECOVERY = .90
ENG. INLET MACH NO. = 0.125
C_{DB} = 7 C_T (NOZZLE) = 0.97
ENGINE C_T = 0.69 η_c = 0.94 I_F = 1587 SEC.

REFERENCE: PR 46 (AL-1900-46) DEC. 1954

Form 1277-C

Date 6/12/57

Prepared By R. W. HANSON

Checked By

Revised Date

CONVAIR

A DIVISION OF GENERAL DYNAMICS CORPORATION

SAN DIEGO, CALIFORNIA

Model

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Penn

Report No. ZM-486

NAVAHO II BOOSTER

DEMEUSIONAL DATA

LENGTH = 1098 IN.

DIAMETER = 93.85 IN.

STABILIZER AREA = 142 SQ. FT.

SEPARATION SURFACE AREA = 24 SQ. FT.

PROPULSION DATA

TOTAL THRUST (SEA LEVEL) = 405,000 #

I_{sp} (SEA LEVEL) = 245 SEC.

BURNING TIME (NORMAL) = 93 SEC.

PROPELLANTS = JP-5 & LOX.

PERFORMANCE (NORMAL) AND

WEIGHT DATA

ROCKET CUTOFF MACH. NO. = 3.45

ROCKET CUTOFF ALTITUDE = 59,000 FT.

SEPARATION ALTITUDE = 70,000 FT.

GROSS WEIGHT = 169,500 #

END BOOST WT. = 16,450 #

REMARKS:

BOOSTER IS PARALLEL AND UNDER
SLUNG.

REF: AL-1900-46 / 15 JAN 1955

Date 10 SEPT. 1956

Prepared By CHALK

Checked By

Revised Date 9/7/57

HANSON

CONVAIR

A DIVISION OF GENERAL DYNAMICS CORPORATION

SAN DIEGO, CALIFORNIA

Model SAM

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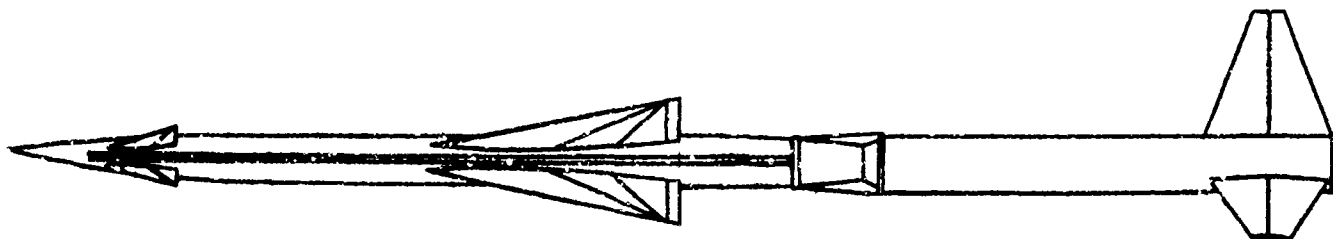
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Report No. ZM-486

SPONSOR: ARMY ORD

MFGR: DOUGLAS

NIKE-AJAX



LENGTH: 32' 7 3/8"

DIAMETER: MISSILE 13.5" BOOSTER 16.5"

SPAN: NOSE FINN = 1 FT. — TAIL FINN 5.25 FT.

WEIGHT: MISSILE 1.125# MISSILE + BOOSTER 2325#

WARHEAD: HE 5th CLUSTERS FRAGMENTATION

GUIDANCE: GROUND COMMAND

PROPULSION: SOLID PROP BOOSTER, LIQUID PROP SUSTAINER
3DS-47,000-X201AZ

RANGE: 25 N. MI.

VELOCITY: M=2.0

ALTITUDE: 60,000'

REMARKS: MAX LIVER ACCELERATIONS - 5g @ 40,000',
2.5g @ 60,000'

SECRET

REFERENCE: 9095-53-9195-54

Form 1277-C

Date 6/11/57
Prepared By C.M. HANSON
Checked By
Revised Date

CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA
Model. _____

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Report No. ZM-486

NIKE-AJAX

BOOSTER PROPELLANT UNIT

LENGTH (OVERALL) = 135 IN.

DIAMETER:

PRINCIPAL = 16.5 IN.

MAXIMUM = 17.562 IN.

WEIGHT:

LOADED = 1165 #

EXPENDED = 370 #

THRUST (T) = 49,000 #

IMPULSE (I) = 147,500 # SEC.

TIME OF BURN (t_b @ 77°F) = 2.89 SEC.

AVERAGE PRESSURE (P_b) = 1080 PSI

SPECIFIC IMPULSE (I_{sp}) = 197.9

THRUST-TO-PRESSURE CONVERSION FACTOR = 0.022

PORT-TO-THROAT AREA RATIO, A/A^* = 1.95

NOZZLE EXPANSION CONE ANGLE = 30°

NOZZLE THROAT DIAMETER = 6.150"

NOZZLE EXIT DIAMETER = 16.541"

REF: JATO MANUAL

Date 3/7/57

Prepared By C.M. HANSON

Checked By

Rev'sed Date

CONVAIR

A DIVISION OF GENERAL DYNAMICS CORPORATION

SAN DIEGO, CALIFORNIA

Model SAM

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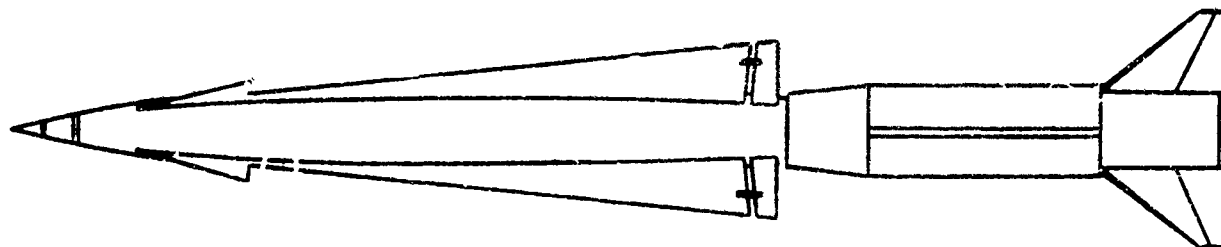
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Report No. ZM-486

SPONSOR: ARMY ORD

MFGR: DOUGLASS

NIKE-HERCULES



LENGTH: 39' 1 7/8" OVERALL, MISSILE = 26' 11"

DIAMETER: 30"

SPAN: WING = 7' 6"

WEIGHT: MISSILE & BOOSTER = 9800#, $W_M = 4800\#$, $W_B = 3020\#$

WARHEAD: 1200# XW-7

GUIDANCE: BEAM RIDER

PROPULSION (4) NIKE-A MAX BOOSTERS, LIQUID PROP. ROCKET SUSTAINER (4)

RANGE: 50 N.MI. (LIMIT OF RADAR)

VELOCITY: $M = 3.5$

ALTITUDE: 80,000'

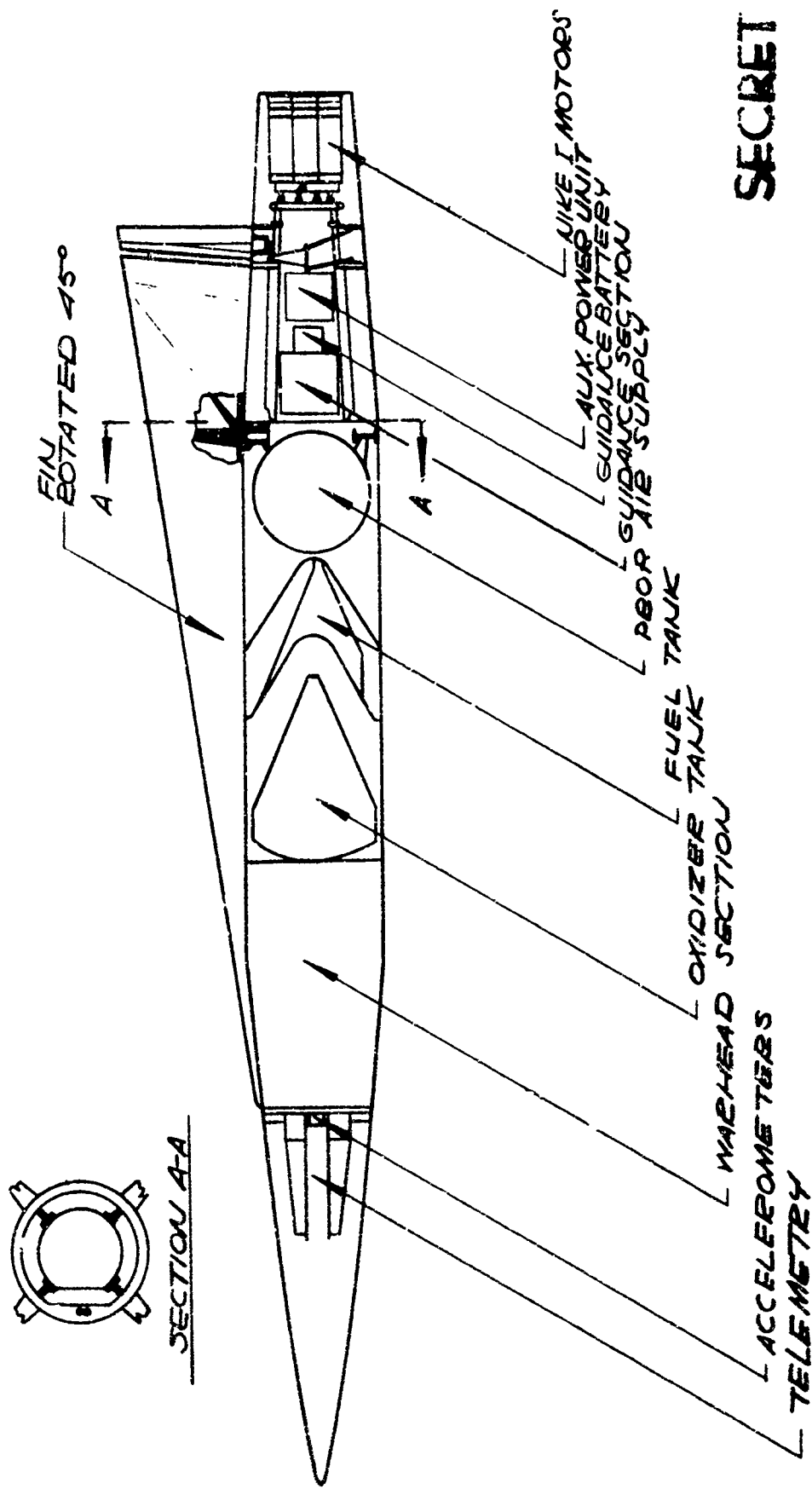
REMARKS: WARHEAD DETONATION: @ S.L. SHOULD BE 4000' ABOVE TARGET, @ 60,000' COALTITUDE. MANEUVER ACCEL. - 5g @ 60,000' 2 1/2 g @ 80,000'

SECRET

REFERENCE:
Form 1277-C

87675-WS-66-23, CONVAIR RPTS. 9096-53, 9096-54

SECRET



SECRET

1) PRODUCTION VERSION USES SOLID PROPELLANT
SUSTAINER MOTOR.

NIKE-HERCULES
6/10/57 REF. 9096-5A
PBT. ZM-46

Date *9/18/57*

Prepared By *C. M. HANSON*

Checked By

Revised Date

CONVAIR

A DIVISION OF GENERAL DYNAMICS CORPORATION

SAN DIEGO, CALIFORNIA

Model *XSAM*

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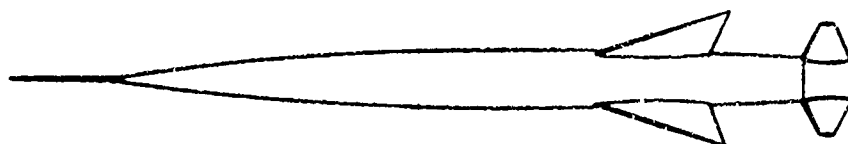
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Report No. *ZM-486*

SPONSOR: *AIR FORCE*

MFGR: *SWISS (OERLIKON)*

OERLIKON



LENGTH: *178"*

DIAMETER: *SLIGHTLY OVER 15"*

SPAN: *4'*

WEIGHT: *600^{lb}*

WARHEAD:

GUIDANCE: *BEAM RIDER*

PROPULSION: *LIQUID PROPELLANT ROCKET*

RANGE: *10 N. MI.*

VELOCITY: *M=2.0*

ALTITUDE: *65,000'*

REMARKS: *AIR FORCE EVALUATION UNDER MX 1869 PROGRAM*

SECRET

REFERENCE: *CONVAIR, TM-339-42-2*

Form 1277-C

Date 10 SEPT. 1956
Prepared By CHALK
Checked By
Revised Date 3/7/57
C.M. HANSON

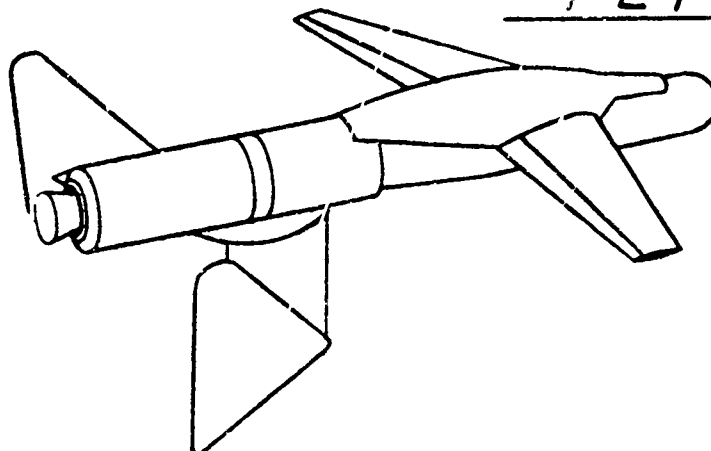
CONVAIR SECRET
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA
Model XAUM-AU-2

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Report No ZM-486

SPONSOR: BUORD
MFGR:

PETREL



LENGTH: 23'

DIAMETER:

SPAN: 13'

WEIGHT: 3800*

WARHEAD: TORPEDO

GUIDANCE: MK-21 ACOUSTIC HOMING TORPEDO, AN/DPA-1 RADAR
AND AUTOPILOT

PROPULSION FAIRCHILD TURBO-JET ENGINE (J-44)

RANGE:

VELOCITY:

ALTITUDE:

REMARKS: LAUNCHED FROM PBY-CB

SECRET

REFERENCE. DIGEST, U.S. NAV. AV. ELECT. (SEPT. 1954)
Form 1277-C

Date *17 FEB 1958*
Prepared By *C. HANSON*
Checked By
Revised Date

51.1
CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA
Model *FBM*

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Report No. *ZM-486*

SPONSOR: *NAVY*
MFGR: *LOCKHEED*

POLARIS

GENERAL DATA SHEET

LENGTH: *28.5 FT.*

DIAMETER: *54 IN.*

SPAN: *NONE*

WEIGHT: *29,082* (SEE WEIGHT BREAKDOWN SHT.)*

WARHEAD: *NUCLEAR- 600* EST.*

GUIDANCE: *DRAPER SHIP INERTIAL NAVIGATION
SYSTEM (SINS)*

PROPULSION: *SOLID PROPELLANT (SEE PROP. DATA SHT.)*

RANGE: *700 - 1500 N.MI*

VELOCITY: *M-15*

ALTITUDE: *350 N.MI.*

REMARKS: *SEE REMARKS SHT.*

REFERENCE
Form 1277-C

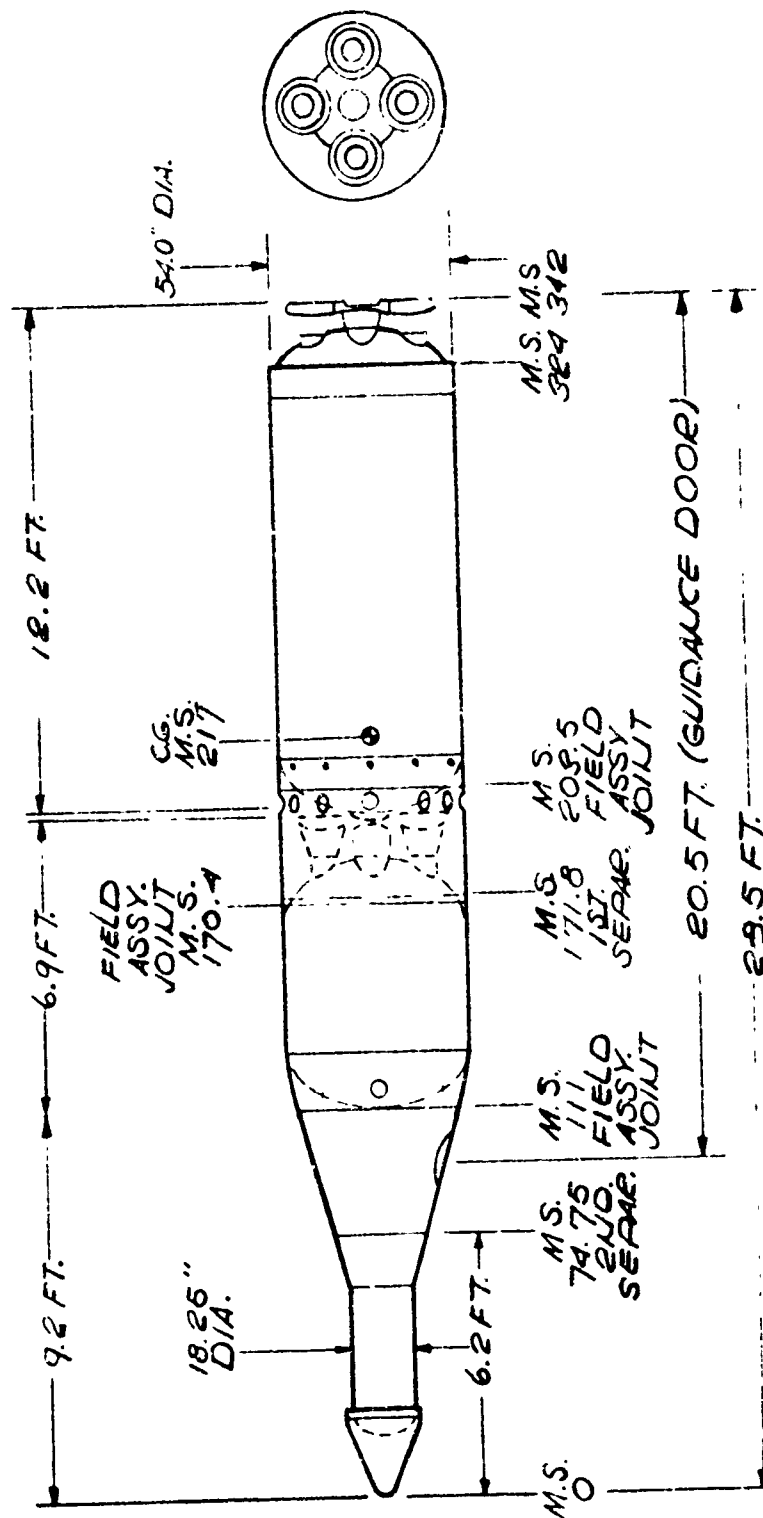
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Date
Prepared By
Checked By
Revised Date

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A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO CALIFORNIA
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Report No.



POLARIS GENERAL ARRANGEMENT

REF: 17156

Date
Prepared By
Checked By
Revised Date

C O N V A I R
SAN DIEGO CALIFORNIA
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Report No

POLARIS WEIGHT BREAKDOWN

LAUNCH GROSS WT 29,082
1ST STAGE GROSS 16,778

PROPULSION		18,346
PROPELLANT	16,300	
MOTOR CASE & IGNITER	1,943	
JETEVATORS	37	
ATTACH STRUCTURE	20	
LAUNCH STRUCTURE	46	
AIRFRAME		182
STRUCTURE	142	
EQUIPMENT & DISCONNECT	40	
FLIGHT CONTROL		48
DESTRUCT		20

2ND STAGE GROSS 9,469

PROPULSION		7,600
PROPELLANT	7,600	
MOTOR CASE & IGNITER	796	
JETEVATORS	57	
THRUST TERMINATION	57	
ATTACH STRUCTURE	37	
AIRFRAME		204
STRUCTURE	135	
NOSE CAP	20	
EQUIPMENT & DISCONNECT	49	
FLIGHT CONTROL		93
CONTROLS	48	
AUTOPILOT	45	
AUXILIARY POWER		58
GUIDANCE		205
BEACON		15
CONTINGENCY		50

REENTRY BODY 835

WARHEAD	600
SHIELD, STRUCTURE & EQUIP	185
CONTINGENCY	50

REF: 17156

Date 2/18/58

Prepared By C. HANSON

Checked By

Revised Date

C. O. P. V. A. I. R.

Model

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Penn

Report No. ZM-486

POLARIS PROPELLANT DATA

1ST STAGE:

1. TOTAL IMPULSE = 3.8×10^6 LB-SEC.
2. TIME OF BURN = 60 SEC.
3. BURNING RATE OF PROPELLANT = 0.3 IN/SEC.
4. PROPELLANT SPECIFIC IMPULSE = 240 SEC.
5. CHAMBER PRESSURE = 1000 PSIA
6. WEIGHT OF PROPELLANT = 16,300 LBS.
7. THRUST VECTOR CONTROL $\approx 8^\circ$ THRUST DEFLECTION
8. THRUST TERMINATION HOLDS TOTAL IMPULSE WITHIN 120 LB.-SEC.

2ND STAGE:

1. TOTAL IMPULSE = 2×10^6 LB-SEC.
2. TIME OF BURN = 65 SEC.
3. BURNING RATE OF PROPELLANT = 0.33 IN/SEC.
4. PROPELLANT SPECIFIC IMPULSE = 240 SEC.
5. CHAMBER PRESSURE = 400 PSIA
6. WEIGHT OF PROPELLANT = 7600 LBS.

REF: POLARIS DATA FROM DITMARS 30 JAN. 1958

Date 2/18/58

Prepared By K. HANSON

Checked By

Revised Date

CONFIDENTIAL

A DIVISION OF GENERAL DYNAMICS CORPORATION

SAN DIEGO, CALIFORNIA

Model.

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Report No. ZM-486

POLARIS REMARKS

POLARIS USES TWO STAGES OF SOLID PROPELLANT ROCKET MOTORS WITH I_{sp} OF APPROXIMATELY 240 #SEC/# IN A LIGHT WEIGHT CASE AND NOZZLE DESIGN. EACH ROCKET MOTOR HAS FOUR NOZZLES WITH MOVABLE OUTER RIMS (JETEVATORS) WHICH ARE OPERATED TO PROVIDE PITCH, YAW, & ROLL CONTROL OF THE MISSILE. THE THRUST OF THE SECOND STAGE MOTOR MAY BE TERMINATED BY ACTIVATING BLOW OUT PLUGS WHEN THE DESIRED VELOCITY IS OBTAINED. THE THRUST TERMINATING DEVICE IS EXPECTED TO PROVIDE THRUST CUTOFF ACCURATE TO WITHIN THREE MILLI-SECONDS OF THE DESIRED CUTOFF TIME WHICH RESULTS IN A VELOCITY ERROR OF $1/2$ FT/SEC. THE CHAMBER OPERATING PRESSURE OF THE FIRST AND SECOND STAGE MOTORS ARE 1000 AND 400 #/SQ.IN. RESPECTIVELY. THE ROCKET MOTORS ARE DESIGNED TO PROVIDE A REGRESSIVE THRUST CHARACTERISTIC IN ORDER TO KEEP THE MISSILE ACCELERATION DOWN TO A REASONABLE LEVEL. THE FIRST STAGE MOTOR PROVIDES AN AVERAGE THRUST OF APPROXIMATELY 63,000 POUNDS FOR 60.0 SECONDS WHILE THE SECOND STAGE PROVIDES AN AVERAGE THRUST OF 31,000 POUNDS FOR 65 SECONDS.

SECRET

REF: 17156

Date 2/18/58

Prepared By K. HANSON

Checked By

Revised Date

CONFIDENTIAL

A DIVISION OF GENERAL ATOMICS CORPORATION

SAN DIEGO, CALIFORNIA

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Report No. ZM-486

POLARIS REMARKS

POLARIS USES TWO STAGES OF SOLID PROPELLANT ROCKET MOTORS WITH I_{sp} OF APPROXIMATELY 240 #SEC/# IN A LIGHT WEIGHT CASE AND NOZZLE DESIGN. EACH ROCKET MOTOR HAS FOUR NOZZLES WITH MOVABLE OUTER RIMS (JETEVATORS) WHICH ARE OPERATED TO PROVIDE PITCH, YAW, & ROLL CONTROL OF THE MISSILE. THE THRUST OF THE SECOND STAGE MOTOR MAY BE TERMINATED BY ACTIVATING BLOW OUT PLUGS WHEN THE DESIRED VELOCITY IS OBTAINED. THE THRUST TERMINATING DEVICE IS EXPECTED TO PROVIDE THRUST CUTOFF ACCURATE TO WITHIN THREE MILLI-SECONDS OF THE DESIRED CUTOFF TIME WHICH RESULTS IN A VELOCITY ERROR OF $1/2$ FT/SEC. THE CHAMBER OPERATING PRESSURE OF THE FIRST AND SECOND STAGE MOTORS ARE 1000 AND 400 #/SQ. IN. RESPECTIVELY. THE ROCKET MOTORS ARE DESIGNED TO PROVIDE A REGRESSIVE THRUST CHARACTERISTIC IN ORDER TO KEEP THE MISSILE ACCELERATION DOWN TO A REASONABLE LEVEL. THE FIRST STAGE MOTOR PROVIDES AN AVERAGE THRUST OF APPROXIMATELY 63,000 POUNDS FOR 60.0 SECONDS WHILE THE SECOND STAGE PROVIDES AN AVERAGE THRUST OF 31,000 POUNDS FOR 65 SECONDS.

SECRET

REF: 17156

Date *5 MAY '54*

Prepared By *DITMARS*

Checked By *7/2/57*

Revised Date *6-24-57*

C.M. HANSON

CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION

SAN DIEGO, CALIFORNIA

Model *GAM-63*

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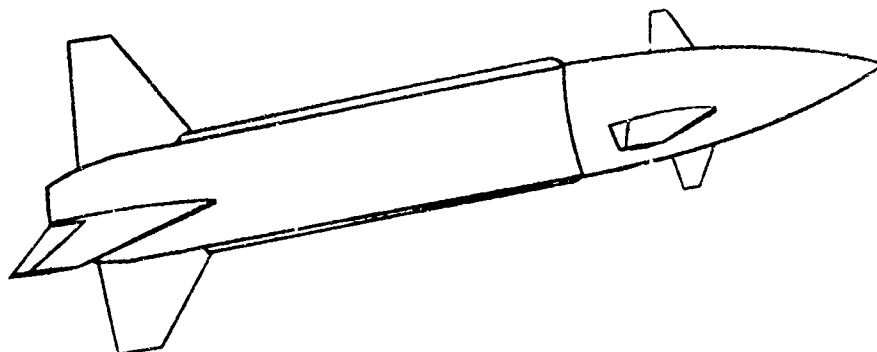
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Report No. *ZM-486*

SPONSOR: *AIRFORCE*

MFGR: *BELL A/C*

RASCAL



LENGTH. *384" (32')*

DIAMETER. *48" (4')*

SPAN: *204" (17') MAX. OVER HORIZ. SURFACES*

WEIGHT: *18,800**

WARHEAD: *3000* (PROVISIONS FOR 5000*)*

GUIDANCE: *LAUNCH & CRUISE PROGRAMMED FROM INFO GATHERED BY LAUNCHING A/C. TERMINAL COMMAND BY RADAR RETURN-RELAY*

PROPULSION. *LIQUID ROCKET-12,000* ACCEL, 4000* CRUISE
BELL DEV. MOTOR (WENJA-JP-4)*

RANGE: *75 U.MI. ACCURACY; MAX. RANGE = 90 U.MI.*

VELOCITY: *M=1.5 TO M=2.5*

ALTITUDE.

REMARKS. *PILOTLESS PARASITE BOMBER LAUNCHED FROM
B-36, B-47 AND B-52. B-63 TO BE OPERATIONAL
WITH B-47 IN 1957. MX-776A "SHRIKE" IS SUPER
SONIC TEST VEHICLE LENGTH-277" DIA-21"
WT-3500, RANGE-50 U.MI., M=2.0*

SECRET

REFERENCE.
Form 1277-C

BELL QPR - #BMPR31 (31 DEC '52), (08431-54)

Date 6/13/57
Prepared By C. M. HANSON
Checked By
Revised Date

CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA
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RASCAL

PROPULSION

THE RASCAL IS A TWO PHASE LIQUID BI-PROPELLANT ROCKET. THE BOOST PHASE OF 12,000# THRUST ACCELERATES THE MISSILE TO SUPERSONIC SPEEDS QUICKLY. THE CRUISE PHASE OF 4000# THRUST MAINTAINS THE SUPERSONIC SPEEDS.

$I_{sp} = 242 \text{ SEC.}$

WT. OF ENGINE (XLR-67-BA-1) = 600#

PROPELLANT = WHITE FUMING NITRIC ACID
AND AVIATION FUEL (JP-4)

RATIO OF OXIDIZER TO FUEL:

WFNA = 615 GAL., JP-4 = 295 GAL.

DESIGNED FOR COMPLETE GAS EXPANSION
@ 12,000.'

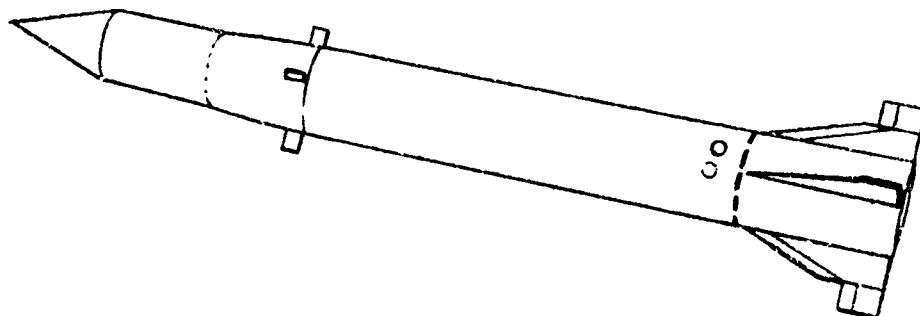
REF (03431-54)

Date 13 MAY '54 **CONVAIR** SEC. 111 Page
Prepared By D. THARS A DIVISION OF GENERAL DYNAMICS CORPORATION
Checked By CM. HANSON SAN DIEGO, CALIFORNIA
Revised Date 3/8/52 Model XSSM-A-14

Report No. ZM-986

SPONSOR: ARMY ORD. (REDSTONE ARSENAL)
MFGR: CHRYSLER CORP.

REDSTONE



LENGTH: 720"

DIAMETER: WARHEAD SECT = 64" BOOSTER BODY = 70"

SPAN: 120"

WEIGHT: 60,000* (WH = 10,664*, CENTER SECT = 2,121*, TAIL SECT = 2,515*
POWER PLANT = 1,500*, LOV = 22,520*, ALCOHOL 17,000*
HYD. PROX. 680*)

WARHEAD: 6900*

GUIDANCE: BALLISTIC TRAJECTORY-CONTROLLED ROCKET
CUT-OFF. INERTIAL GUIDANCE

PROPULSION: LOX-ALCOHOL LIQUID ROCKET

RANGE: 150 N. MI.

VELOCITY: > M = 2.0 (DIVE IN) M = 4.5 @ BURN-OUT

ALTITUDE: 45 N. MI.

REMARKS: NOSE (W.H.) SECTION SEPARATES FROM BOOSTER
BOOSTER TO HAVE ABOUT 5 N. MI. GREATER
RANGE THAN W.H.
75 MISSILES SCHEDULED FOR FIRING
BY DEC '56.

REFERENCE: ARMY ORD: REDSTONE ARSENAL PR-5, 6 (DEC '52)
Form 1277-C

Date 5 MAY 54
Prepared By DITMARS
Checked By
Revised Date 3/8/57
C.M. HANSON

CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA
Model XSSM-N-8

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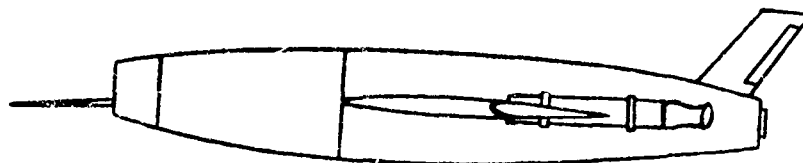
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Report No ZM-486

SPONSOR: BUAER

MFGR: CHANCE-VOUGHT

REGULUS



LENGTH: BODY = 32.2' OVERALL 34.5'

DIAMETER: 56.5'

SPAN: 21' BICONVEX, SWEPT (40° @ 1/4 CHORD)

WEIGHT: GROSS = 13,300#

WARHEAD: 3000#

GUIDANCE: COMMAND FROM LAUNCHING SUBMARINE (INITIAL PHASE)
COMMAND FROM SUB. OR 1/2 (TERM PHASE) TELESCOPE

PROPULSION J39-A-14 TURBO JET - 3KS-33,000 BOOST SAP(2)

RANGE: 500 N.M.

VELOCITY: CRUISE, M=0.9 DIVE IN, M=1.15

ALTITUDE: 35,000'

REMARKS: DESIGNED TO BE LAUNCHED FROM SURFACED
SUBMARINE CONVERSION OF USS TUNNY TO
REGULUS MISSILE SUBMARINE STARTED
IN '52

REFERENCE: C-V. PR-1 (JUNE '51), PR-2 (DEC. '51)
Form 1277-C

Date 11/4/57
Prepared By S.M. HANSON
Checked By
Revised Date

CONVAIR
AERONAUTICAL ENGINEERING
SAN DIEGO, CALIFORNIA
Model

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Penn []

Report No ZM-486

PEGULUS I, BOOSTER

ROCKET ENGINE CHARACTERISTICS, (EACH) (3KS-30,000)

DURATION = 3 SEC.

THRUST @ 60°F (ALONG AXIS OF NOZZLE) = 30,000 #

TOTAL IMPULSE = 90,000 #/SEC

LOADED WEIGHT = 1150 #

EMPTY WEIGHT = 730 #

PROPELLANT:

TYPE = AERODLEX AN-623

WEIGHT = 420 #

I_{sp} = 84 SEC.

REF: ARROJET-GENERAL (TECH. INFO. HANDBOOK)
SOLID PROPELLANT ROCKETS.

Date 11-9-54

Prepared By DITMARS

Checked By 7/23/57

Revised Date 6-24-57

CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION

SAN DIEGO, CALIFORNIA

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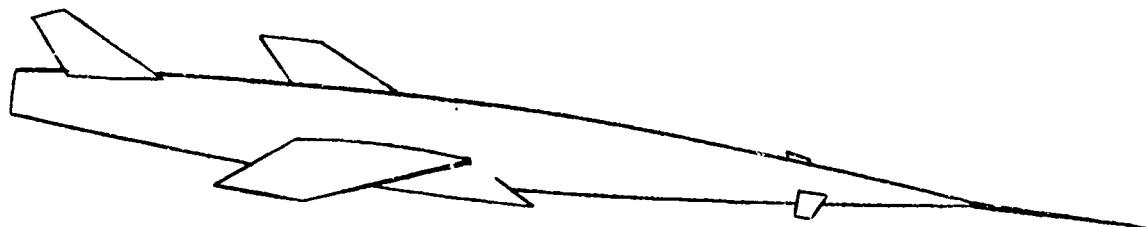
Penn

Report No. ZM-406

SPONSOR: BU ORD

MFGR: CHANCE-VOUGHT

REGULUS 2



LENGTH. 56.9 FT.

DIAMETER: 56.4" (4.7')

SPAN: WING = 20.29' TAIL = 6.5'

WEIGHT: LAUNCH = 23,235 - FLT. GROSS = 18,535 - EMPTY = 13,460

WARHEAD: 3000 #

GUIDANCE: (MID COURSE) - BENDIX BI-POLAR OR TROJAN (TERM)
SAME AS REGULUS

PROPULSION: J65-W (11,000 # WITH A.B.) SOLID PROP ROCKET BOOST
11,000 # @ 8500 RPM COMBAT THRUST, 7,600 # @ 8500 RPM MILITARY
THRUST.

RANGE: UP TO 1,000 N. MI. (EST.)

VELOCITY: M = 2.0 CRUISE

ALTITUDE: 55,000' CRUISE

REMARKS: GUIDANCE HAS NOMINAL RANGE OF 200 N. MI.
FROM PICKET INSTAL (AU/DPU-22 BEACON)
TERMINAL - PROGRAMMED OR RADIO CONTROL.
SOLID PROP. ROCKET BOOSTER (2) - 4KS-115,000

SECRET

REFERENCE: C.V. RPT # 14379 (PROPOSAL)
Form 1277-C

Date 7-SEPT. '56
Prepared By CHALK
Checked By 7/22/57
Revised Date 9/17/57
C.M. HANSON

CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA
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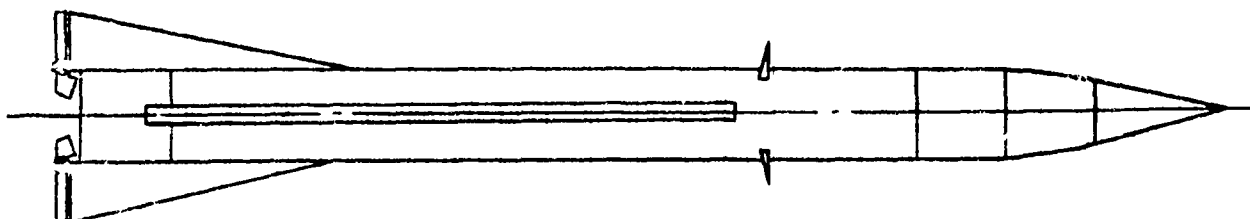
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Penn _____

Report No. ZM 486

SPONSOR: ARMY ORD.

MFGR: FIRESTONE - GILFILLAN

SERGEANT



LENGTH: 31'

DIAMETER: 31"

SPAN: 78"

WEIGHT: GROSS = 10,140[#] BURN-OUT = 4,945[#]

WARHEAD: 1500[#]

GUIDANCE: INERTIAL

PROPULSION: SOLID PROPELLANT ROCKET (26KS-48,000)

RANGE: 25-75 N.M. (CEP < 100 YDS.)

VELOCITY: AV. 2650 FT./SEC.

ALTITUDE:

REMARKS: BALLISTIC MISSILE DEVELOPED FROM CORPORAL

SECRET

REFERENCE: CNAK-03766, RPT. GMS[#]50-57
Form 1277-C

Date 6/19/57
Prepared By C. M. HANSON
Checked By
Revised Date
CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA
Model

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Report No ZM-486

SERGEANT

PROPULSION UNIT

LENGTH (OVERALL) = 231.08 IN.

DIAMETER = 31.00 IN.

WEIGHT:

LOADED = 8542 LB.

EXPENDED = 1281 LB.

PROPELLANT TYPE = T17E-1 (POLYSULFIDE-
PERCHLORATE)

TIME OF BURN (T_b @ 70°F) = 24.0 SEC.

THRUST = 47,500 LBF.

TOTAL IMPULSE = 1,310,000 LBF-SEC.

AVERAGE PRESSURE ($P_{OVERT.}$) = 525 PSIA.

I_{sp} = 186 LBF-SEC/LB.

CROSS-SECTION LOADING DENSITY = 86.2%

NOZZLE EXPANSION CONE ANGLE = 30°

NOZZLE THROAT DIA. = 9.13 IN.

NOZZLE EXIT DIA. = 22.6 IN.

PORT-TO-THROAT AREA RATIO A_0/A_1 = 1.59

NOZZLE DESIGNED FOR OPTIMUM EX-
PANSION @ 10,000 FT. ALT.

REF: JATO MANUAL

Date 5 NOV '59
Prepared By DITMARS
Checked By
Revised Date 2/21/57
C.M. HANSON

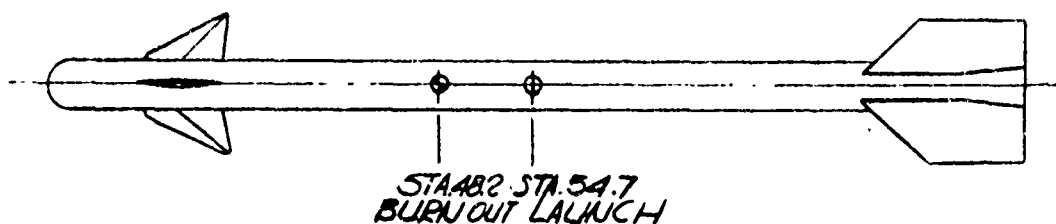
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A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA
Model XAAM-N-7

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Temp Penn

Report No. ZM-496

SPONSOR: BUORD (NOTS-RFD)
MFGR: PHILCO

SIDEWINDER I



LENGTH. 109" | WING- $C_R=21.0"$ $C_T=14.2"$
DIAMETER: 5" | CANARD- $C_R=9.1"$
SPAN: WING 21.0" CANARD=15.06" (INTERDIGATED CRUXIFORM)
WEIGHT. 155#
WARHEAD: 20# (13# EXP-4 FRAG) $R_k=50\%$ $R_L=30'$
GUIDANCE: INFRARED SEEKER CONTACT FUSE
PROPULSION. SOLID PROP. HPAG ROCKET - 2.2KS-4000
RANGE: 2500 YDS. @ 5000' - 7000 YDS @ 50,000'
VELOCITY: $M=2.3$ ($\frac{1}{2} M=.8$)
ALTITUDE. 50000' (4G) 7G @ 5,000'
REMARKS SOLID PROPELLANT HOT GAS TURBINE
POWER SUPPLY & SERVO ACTUATORS
10 G MANEUVER LIMITATION, COST \$800 @
DEL. 1.5 RATE OF 100,000/YEAR

REFERENCE.
Form 1277-C

NOTS PUBLICATION #343 (APRIL '54)
(O1610-53) DIGEST U.S. NAV. AV. ELECTRONICS (SEPT. 54)

Date 5 MAY '54

Prepared By DITMARS

Checked By 7/22/57

Revised Date 9/13/57

C. HANSON

CONVAIR

A DIVISION OF GENERAL DYNAMICS CORPORATION

SAN DIEGO, CALIFORNIA

Model X-55M-A-3

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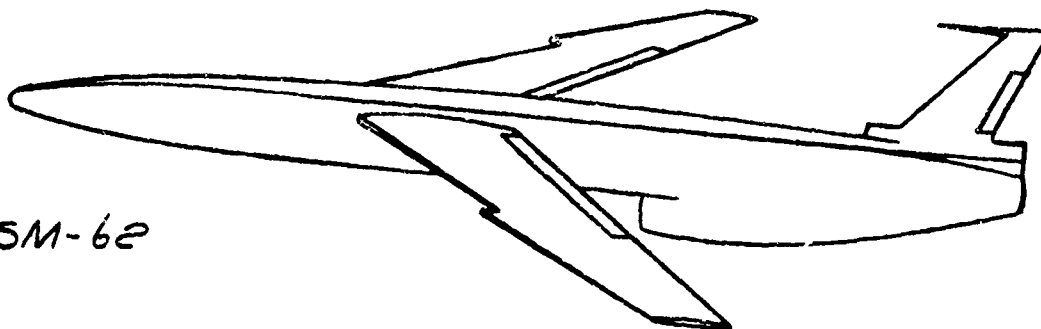
Report No. ZM-456

SPONSOR: AIR FORCE

MFGR: NORTHROP

SNARK

SM-62



LENGTH: 806.44"

DIAMETER: 60"

SPAN: 510"

WEIGHT: 45,000[#] (DESIGN GROSS) 38,000[#] LIMIT WITH PRES. BOOSTER.

WARHEAD: 7000[#]

GUIDANCE: INERTIAL-DROPLER RADAR-MID-COURSE-AUTO. CELESTIAL NAVIG., TERMINAL-INERTIAL, CONTROLLED-DIVE

PROPULSION: 4J-71A-3 (9700[#] MIL.)-BOOST (2) 4DS-105,000 SPR.

RANGE: 5500 N.MI.

VELOCITY: CRUISE-M=94 TERMINAL-M=1.3 TO M=1.4

ALTITUDE: 40,000'

REMARKS: 65 MISSILE TEST PROGRAM SCHED. FOR COMPL. JUNE '54. SUBSONIC OPERATIONAL 1954 SUPERSONIC (WITH A.B.) OPERATIONAL 1955.

SECRET

REFERENCE: NORTHROP RPT. #GM 932 (JUNE '52)

Form 1277-C

Date 6/12/57

Prepared By C. HANSON

Checked By

Revised Date

CONVAIR

A DIVISION OF GENERAL DYNAMICS CORPORATION

SAN DIEGO, CALIFORNIA

Model _____

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SECRET

Report No. ZM-486

SHARK

BOOSTER PROPELLSION UNIT(2) (A.DS-105,000)

LENGTH(OVERALL) = 200 IN

DIAMETER:

PRINCIPAL = 22.875 IN.

MAXIMUM = 24.250 IN.

$W_p = 2050$

TIME OF BURN = 3.58 SEC.

AVERAGE PRESSURE (\bar{p}) = 1190 PSI

PORT-TO-THROAT AREA RATIO, $A/A_t = 2.48$

NOZZLE EXPANSION CONE ANGLE = 30°

NOZZLE THROAT DIAMETER = 8.59 IN.

NOZZLE EXIT DIAMETER = 21.65 IN.

REF: JATO MANUAL

SECRET

Date 3 NOV '54
Prepared By DITMARS
Checked By 7/1/57
Revised Date 9/1/57
CM HANSON

CONVAIR SECRET
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA
Model XASM-61-E

SECRET

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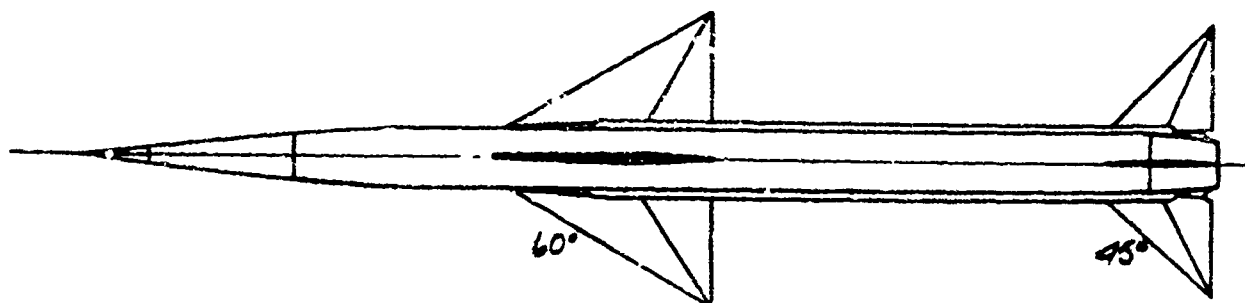
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Report No. ZM-486

SPONSOR: BLAIR

MFGR: SPERRY-DOUGLAS

SPARROW I



LENGTH: 155.5"

DIAMETER: 8"

SPAN: WING=37" FIN=34.8" IN LINE CRUCIFORM

WEIGHT: 335#

WARHEAD: 44" FRAGMENTATION (PROXIMITY FUSE)

GUIDANCE: LINE OF SIGHT BEAM RIDER

PROPULSION: SOLID ROCKET 1BK5-7800, X113C4

RANGE: 3800 TO 14,000 YDS (SLANT RANGE)

VELOCITY: M=1.15 (MIN) M=2.7 (MAX)

ALTITUDE: 50,000'

REMARKS: WING SPAN PRECLUDES COMPLETELY
SUBMERGED STOWAGE IN F-102A

SECRET

REFERENCE:
Form 1277-C

SPERRY (OLD FILE) = 5256-2247
5257-2328
SPERRY PR-19 & SPERRY RPT. 14.2A (REV. 4'54)

Date 29 OCT '55

Prepared By DITMAES

Checked By 7/23/57

Revised Date 5/4/57

C.M. HANSON

CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION

SAN DIEGO, CALIFORNIA

Model XAAM-11-3

SECRET

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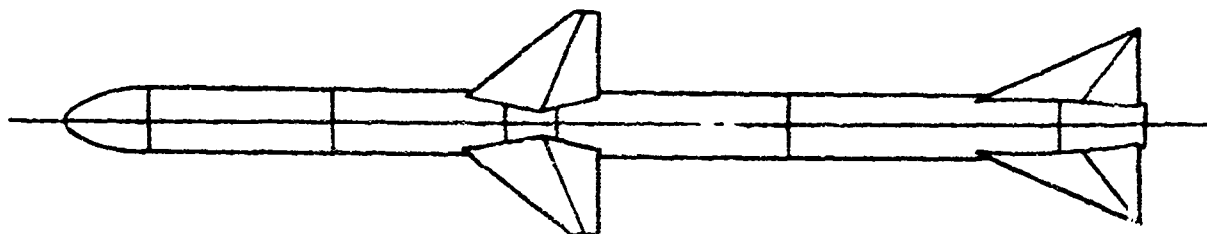
Penn

Report No. ZM 406

SPONSOR: BU AIR

MFGR: SPERRY-DOUGLAS

SPARROW II



LENGTH: 148"

DIAMETER: 8"

SPAN: WING=40.128", TAIL=32"

WEIGHT: 120[±]

WARHEAD: 72[±] ILL. FUSE (FRAGMENTATION WARHEAD = 49[±])

GUIDANCE: ACTIVE RADAR TARGET SEEKER (BENDIX SEEKER AND DPN-21)
WT. = 47[±] 7.5" DIA. X 26" LONG

PROPULSION: SOLID PROPELLANT ROCKET. 1.84 KS-8000
I/W = 125

RANGE: 6 N.MI.

VELOCITY: 3000 FT/SEC

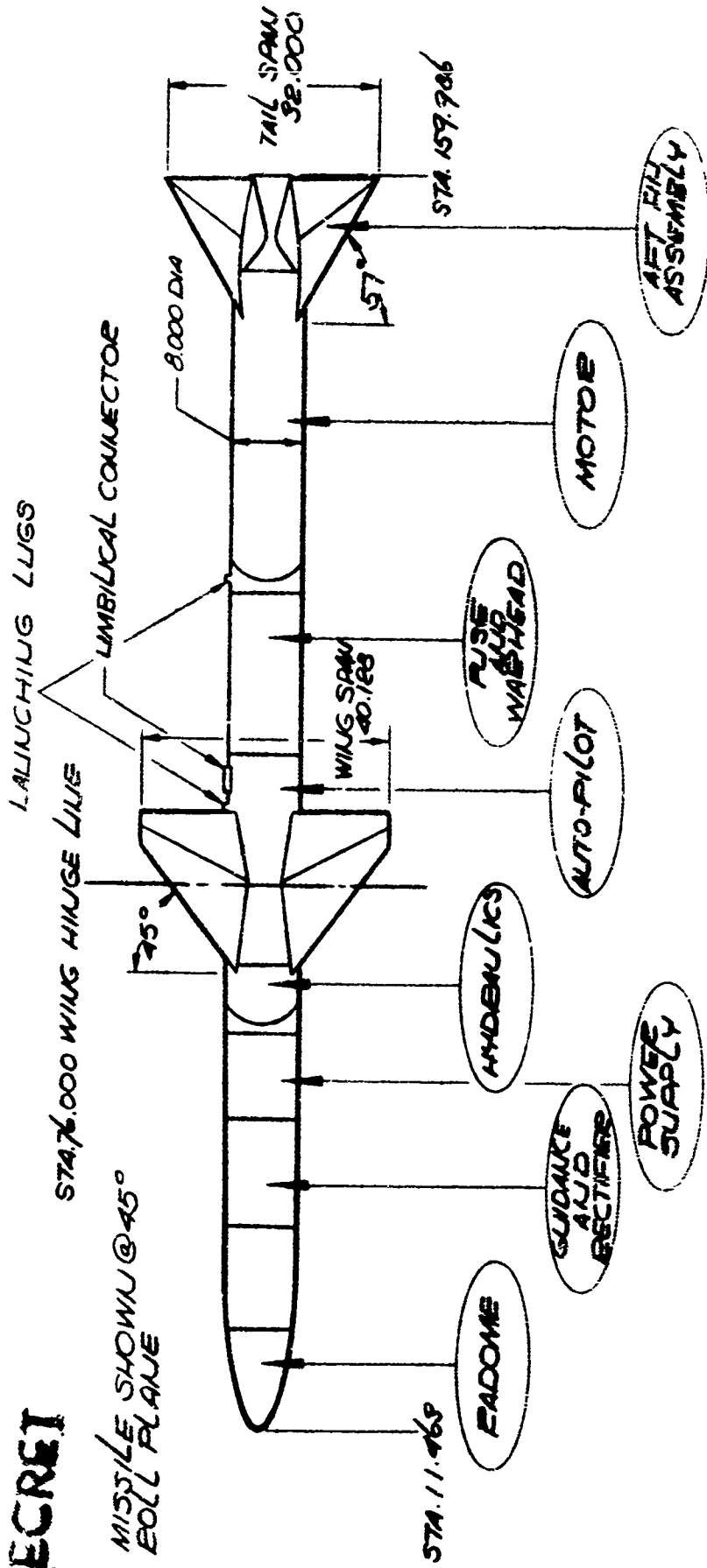
ALTITUDE: 100-60,000 FT.

REMARKS: WINGS ARE ALL MOVEABLE. MAX. MAN. EQ. POWER
SUPPLY - ETHYLENE OXIDE MONO PROPELLANT
HOT GAS GENERATOR - TURBINE DRIVES
ALTERNATOR & HYDRAULIC PUMP.

REFERENCE: 6279-55 (NOV. 1955)

Form 1277-C

SECRET



SEEKER CHARACTERISTICS

FREQUENCY	K-BAND
MODULATION	PULSE
ANTENNA SCAN	COAXIAL
SCAN FREQUENCY	2000 CPS
CONE OF VISION	15°
BEAM WIDTH	7°
PULSE DURATION	.125 SEC.
EDGE GATE	.14 SEC.
EXPOSITION RATE	4000 FPS
PEAK POWER	50 KW
WEIGHT	47 LBS.
LENGTH	96 IN.
MAX. DIA.	7.5 IN.



SEEKER AND RADOME

SECRET

SPARROW II

Date 28 DEC. '59 **CONVAIR**
Prepared By DITMARS A DIVISION OF GENERAL DYNAMICS CORPORATION
Checked By
Revised Date 3/4/57 SAN DIEGO, CALIFORNIA
C.M. HANSON Model XAAM-11-6

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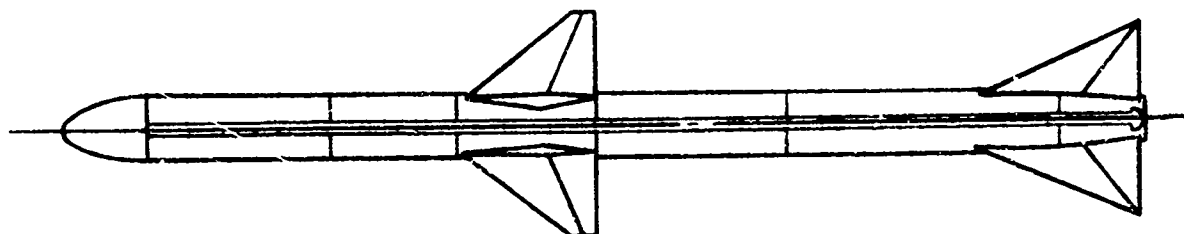
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Temp Penn

Report No ZM486

SPONSOR: BUAIR
MFGR: RAYTHEON

SPARROW III



LENGTH: 144"

DIAMETER: 8"

SPAN: WING = 40" FIN = 32" (TAJDEM CELCIFORM)

WEIGHT: 380#

WARHEAD: 65# CONTINUOUS ROD W.H.

GUIDANCE: SEMI-ACTIVE, FM-CW INTERCHANGABLE WITH IR.

PROPULSION: 1.8K5-7800 SOLID FUEL ROCKET

RANGE: 5-6 N.MI.

VELOCITY: 2460 FT/SEC. ΔV = 1300 FT/SEC.

ALTITUDE: 50,000'

REMARKS: RAYTHEON GUIDANCE CONFIGURATION
POWER SUPPLY IS S.P. GAS GEN. TO DRIVE
GENERATOR INSTEAD OF SILVER-ZINC
BATTERIES AS IN SPARROW I & II

SECRET

REFERENCE: OPERATIONAL & DESIGN INFO.-RAYTHEON-3/16/55
Form: 1277-C

Date 5/7/57
Prepared By CONVAIR
Checked By
Revised Date
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA
Model XSAM

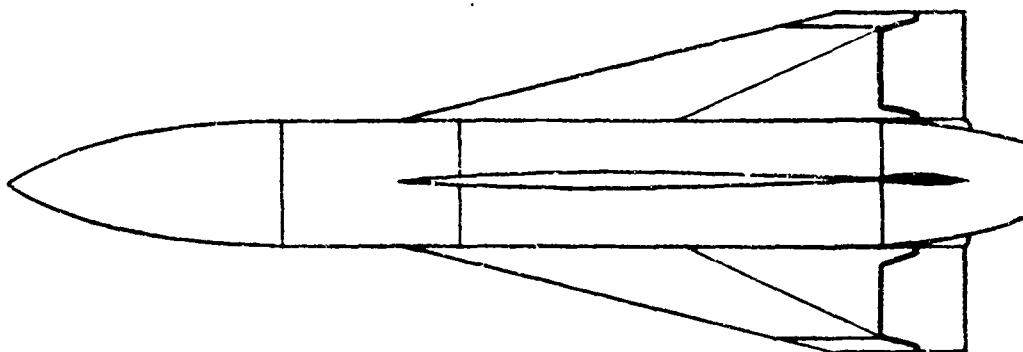
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Penn 1

Report No. ZM-406

SPONSOR: NAVY
MFGR: RAYTHEON MFG. CO.

SPARROW-X



LENGTH 130."

DIAMETER. 4.8"

SPAN. 44"

WEIGHT LAUNCH-825.7#, B.O 645.7#

WARHEAD: FRACTIONAL KT-ATOMIC. WWH=120#

GUIDANCE: PROPORTIONAL HOMING ON TARGET ILLUMINATED BY LAUNCHING AIRCRAFT. SAME EQUIPMENT AS SPARROW III.

PROPULSION SOLID ROCKET $t_b=3$ SEC., $AV=M 2.5$, $T=17,500^\circ$ (3KS-17500)

RANGE 6 MI. @ SL. & 25 MI. @ HIGH ALTITUDE.

VELOCITY: M.7-M.5.

ALTITUDE SEA LEVEL TO 80,000'

REMARKS LOCK ON RANGE FOR RADAR = 20 MI.

SECRET

REFERENCE
Form 1277-C

REF. 14217 BE-81 RAYTHEON (DRAWING NO. 70-178757)

Date *3 MAY '54*

Prepared By *DITMAES*

Checked By *7/22/57*

Revised Date *6/27/57*

C.M. HANSON

CONVAIR

A DIVISION OF GENERAL DYNAMICS CORPORATION

SAN DIEGO, CALIFORNIA

Model *X-3A-N-6B*

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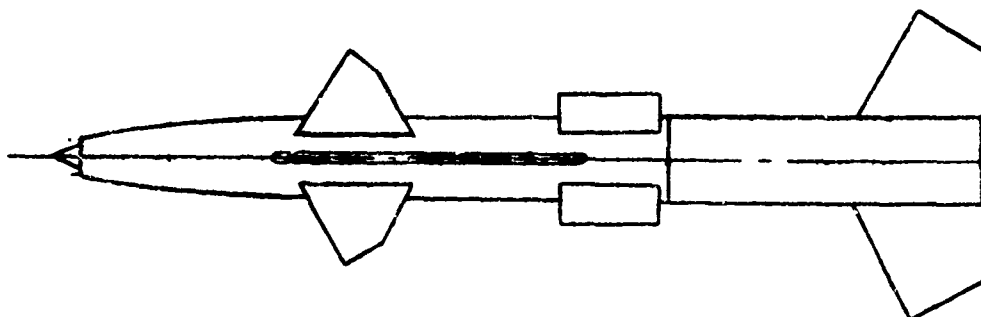
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Report No. *ZM 486*

SPONSOR: *BU ORD*

MFGR: *BENDIX-MCDONNELL*

TALOS



	<u>MISSILE</u>	<u>BOOSTER</u>	<u>COMBINATION</u>
LENGTH:	<i>236"</i>	<i>120"</i>	<i>356"</i>
DIAMETER:	<i>28'</i>	<i>30"</i>	<i>30"</i>
SPAN:	<i>WING=110", FIN=68"</i>		
WEIGHT:	<i>2875 #</i>	<i>3950 #</i>	<i>6825 #</i>
WARHEAD:	<i>420 #</i>		
GUIDANCE:	<i>PROGRAMMED BEAM RIDER PLUS HOMING</i>		
PROPULSION:	<i>RAM JET</i>	<i>BOOSTER-SOLID PROPR 4-1-DS-111,000</i>	
RANGE:	<i>10,000-100,000 YDS (50 N.M.)</i>		
VELOCITY:	<i>2000 FT./SEC.</i>		
ALTITUDE:	<i>60,000'</i>		
REMARKS:	<i>ADVANCED ANTI-AIRCRAFT MISSILE FOR FLEET DEFENCE.</i>		

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REFERENCE:
Form 1277-C

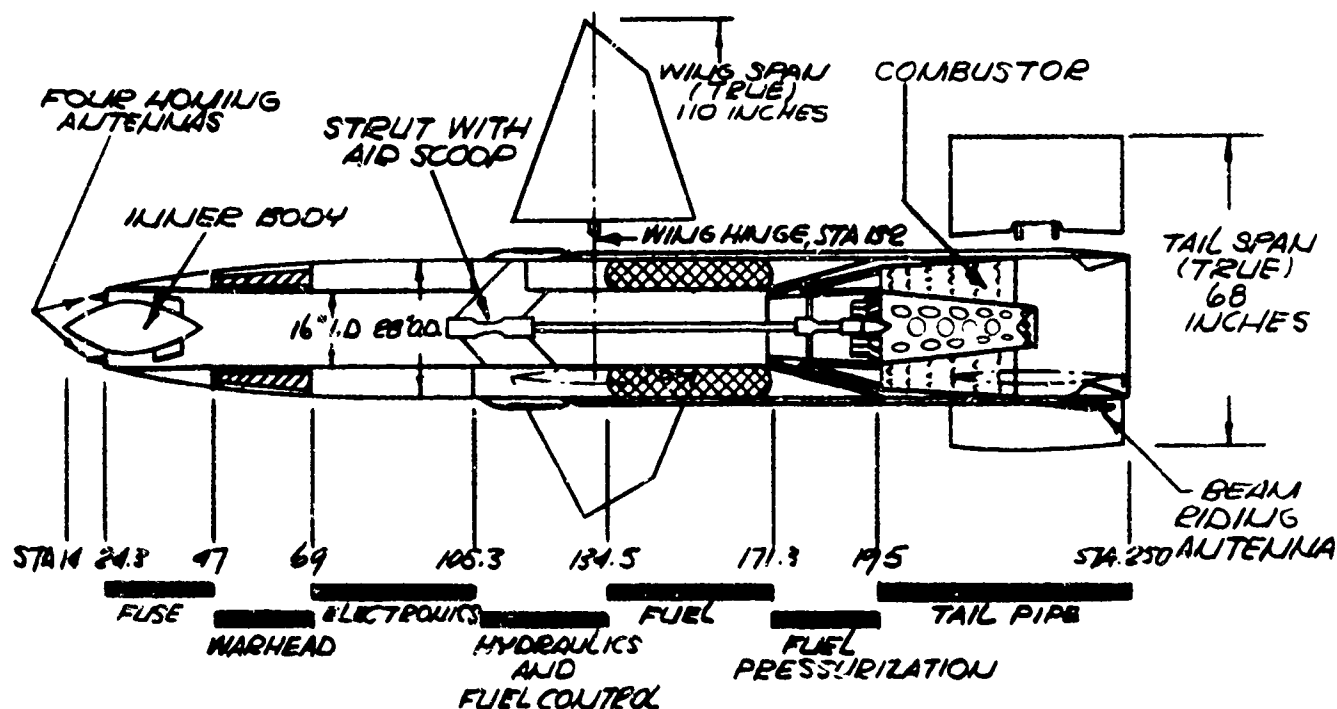
① APL/JHU, TG 60-15 (2-15-54) ② BUMBLEBEE SERIES REPORT #262 (12-56)

Date 11/1/57
 Prepared By CM HANSON
 Checked By
 Revised Date

CONVAIR
 SAN DIEGO, CALIFORNIA
 Model

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 Report No ZM-486

TALOS



INTERNAL ARRANGEMENT OF TALOS MISSILE, VERSION XSAM-U-6B

REF. BULLETIN of ORD. INFO. (Oct 31, 1956) 4-56

Date 7 SEPT 1956

Prepared By CHALK

Checked By

Revised Date 9/18/57

CMH4/USON

SPONSOR: BU ORD.

MFGP: BENDIX-MS DONNELL

CONVAIR

A DIVISION OF GENERAL DYNAMICS CORPORATION

SAN DIEGO, CALIFORNIA

Model

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Report No. ZM 486

TALOS

DEVELOPMENT

MISSILE	LENGTH	WEIGHT LB.	VELOCITY FT/SEC	MANEUVER (g)		ALTITUDE FT.	RANGE N.MI.
				@60,000	@SEALEVEL		
XSAM-N-6B	236	2875	2000	3	12	60,000	50
XSAM-N-6BI	254	3200	21-2400	4	12	70,000	100
XSAM-N-6BW	249	3100	2000	2	9	60,000	50
XSAM-N-6BWI	254	3200	21-2400	3	12	70,000	100

TWO GROUPS:

(1) SAM-N-6B AND SAM-N-6BW HAVE A RANGE OF 50 MI. AND ALT. OF 50,000 FT. THE TRAJECTORY OF SAM-N-6BI= BOOST PHASE, MIDCOURSE GUIDANCE PHASE AND A TERMINAL GUIDANCE PHASE, CAPABLE OF MACH 2. DURING THE BOOST PHASE, THE MISSILE IS BOOSTED FROM A ZERO LENGTH TRAINABLE LAUNCHER TO SUPERSONIC SPEED BY A SOLID-PROPELLANT BOOSTER. THE MIDCOURSE GUIDANCE SYSTEM COMMENCES AFTER BOOSTER SEPARATION, AND DURING THIS PHASE, THE MISSILE RIDES A RADAR BEAM. DURING THE TERMINAL PHASE OF THE TRAJECTORY, THE MISSILE HOMES ON THE TARGET BY MEANS OF A SEMI-ACTIVE RADAR HOMER.

(2) SAM-N-6BW TRAJECTORY IS SIMILAR TO SAM-N-6B EXCEPT THE SAM-N-6BW DOES NOT HAVE THE TERMINAL HOMING PHASE AND IT HAS A SPECIAL WARHEAD.

REFERENCE: APL/JHU-T660-18, FEB. 55 (0394-55)
BULLETIN of ORD. INFO., 31 MARCH 1957

SECRET

Date 7/SEPT-56
Prepared By DITMARS
Checked By
Revised Date 2/28/57
C.M. HANLSON

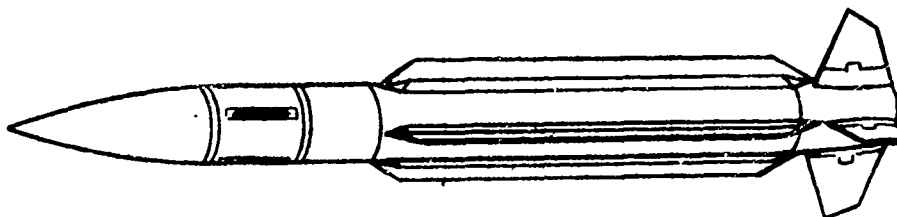
CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA
Model SAM

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Temp Penn

Report No. ZM-486

SPONSOR: BUORD (JHU)
MFGR: CONVAIR (POMONA)

TARTAR



LENGTH: 176"

DIAMETER: 13.5"

SPAN: TAIL: OPEN=42," CLOSED=23." DORSAL FINS=23"

WEIGHT: 1150[#]

WARHEAD: 115[#] CONTINUOUS-ROD [(2) INTERCHANGEABLE MICROWAVE PROXIMITY FLUSE]

GUIDANCE: CW HOMING

PROPULSION: DUAL-THRUST SOLID-PROPELLANT ROCKET
4.0/27.0-KS-15,000/2,000

RANGE: 15,000-20,000 YDS.

VELOCITY: M1.5 - M2.0

ALTITUDE: 50-55,000'

REMARKS: THE PROPELLANT GRAINS BURN IN TWO STAGES: DURING BOOST A THRUST OF 15000[#] FOR 4 SEC. DURING REMAINDER OF FLIGHT THE SLOWER-BURNING SUSTAINER SECT. OF ROCKET PRODUCES THRUST OF 2,000[#] FOR 22 SEC. THIS MISSILE HAS NO ADDITIONAL BOOSTER LENGTH. DESIGNED FOR USE ON DESTROYER AND OTHER SPACE LIMITED CRAFT.

REFERENCE:
Form 1277-C

(JHU) BUMBLEBEE SERIES, RPT #262 (DEC. 56)
POMONA REPT 334-80A "AERO TRIM STAB. & ROUTED CHAR.

Date 11/1/57
Prepared By E. M. HANSON
Checked By
Revised Date

SECRET

A DIVISION OF GENERAL DYNAMICS CORPORATION

SAN DIEGO, CALIFORNIA

Model

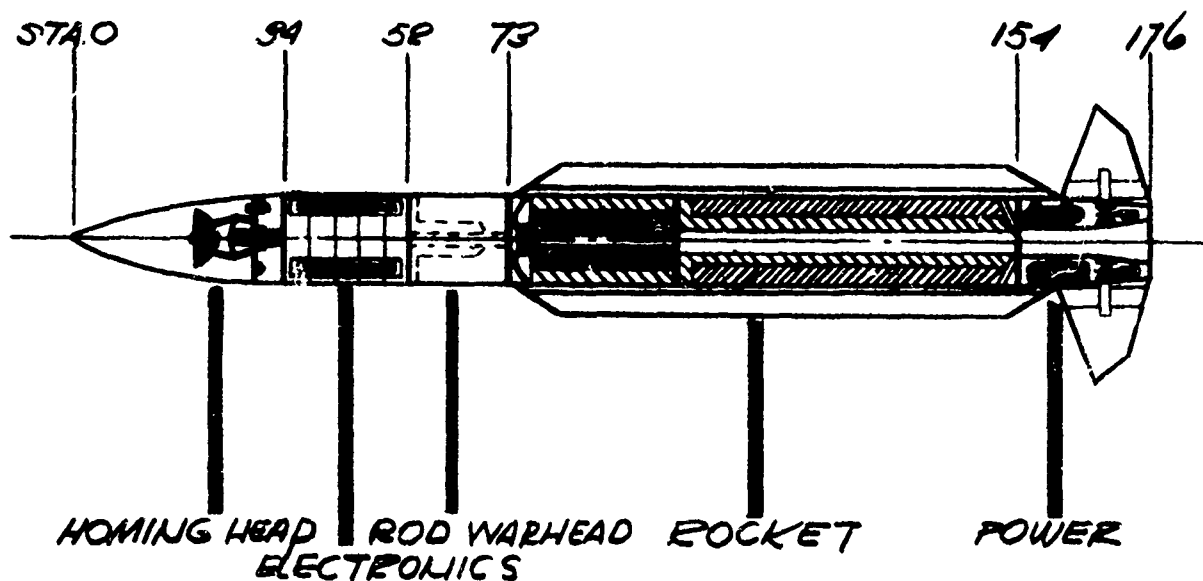
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Report No. ZM-486

TARTAR



TARTAR INTERNAL ARRANGEMENT

SECRET

REF: BULLETIN OF ORDNANCE INFO: DEC. 31-56 (49-56)

Date 4 MAY '54
Prepared By DITMAES
Checked By
Revised Date 8/27/57
C.M. HANSON
CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA
Model SAM-N-7

SECRET

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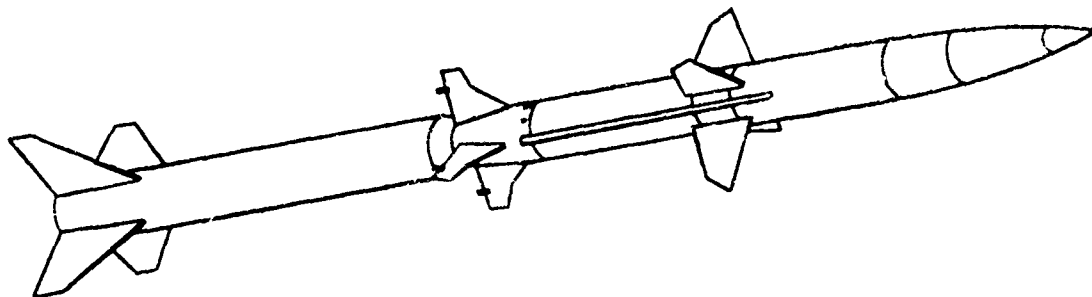
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Report No. ZM 406

SPONSOR: BUORD (JHU)
MFGR: CONVAIR

TERRIER



LENGTH: MISSILE = 183" BOOSTER = 146" TOTAL = 329"
DIAMETER: MISSILE = 13.5" BOOSTER = 16.4"
SPAN: WING = 47.3" TAIL = 40.5"
WEIGHT: MISSILE = 1100# BOOSTER = 1300# GROSS = 2400#
WARHEAD: 220# (MICROWAVE PROXIMITY FUSE)
GUIDANCE: BEAM RIDER
PROPULSION: SUSTAINER = 20 DS-2350 BOOSTER = 2.5 DS-59,000
SOLID PROPELLANT ROCKETS
RANGE: 5,000 TO 20,000 YDS.
VELOCITY: M = 1.5
ALTITUDE: 40,000'
REMARKS: FLEET DEFENCE MISSILE.

SECRET

REFERENCE.
Form 1277-C

① APL/JHU TG-60-15 (2-15-54) ② BUMBLEBEE
SERIES REPT. #262 (DEC. '56)

Date *2/28/57*
Prepared By *C. M. HANSON*
Checked By
Revised Date

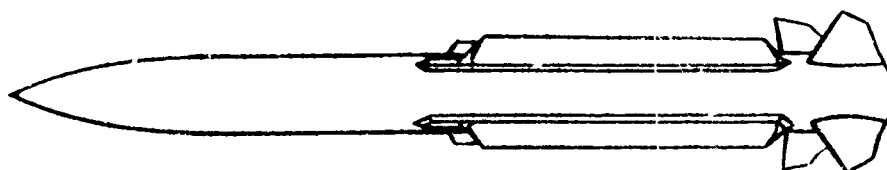
CONVAIR
DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA
Model *SAM-HT-2*

Page
Temp Penn

Report No. *ZM 486*

SPONSOR: *BUORD (JHU)*
MFGR: *CONVAIR*

ADVANCED TERRIER



LENGTH: *162"*

DIAMETER: *13.5"*

SPAN: *DORSAL FINS = 24.0", TAIL FINS = 42.3"*

WEIGHT: *1140⁺*

WARHEAD: *211⁺ CONTINUOUS ROD (WITH MICROWAVE PROXIMITY FUSE)*

GUIDANCE: *HOMER (BT VERSION HAS BEAM RIDER)*

PROPULSION: *SOLID ROCKET (2200⁺ THRUST, t_b = 28.5 SEC)*

RANGE: *40,000 YDS.*

VELOCITY: *M=2.9*

ALTITUDE: *50-80,000'*

REMARKS:

SECRET

TERRIER (BT) HAS BEAM RIDER GUIDANCE, IS 7" SHORTER THAN (HT) WITH SAME WT. AS (BH). CURRENT TERRIER BOOSTER CAN BE USED (BT-2, BH-2), OR CIG-COMPATIBLE BOOSTER (BT-3, BH-3) OVER-ALL LAUNCHING LENGTH OF BT-2 IS 25'11" WITH HT-3 LONGER BY 7" WT=2940.⁺ BT-3 MISSILES PILOT PRODUCTION TO START THE FIRST OF '58. REGULAR PROD. BY MIDDLE OF THAT YEAR. PROD. OF HT-3 MISSILES WILL FOLLOW 15 MO. LATER.

REFERENCE: *(JHU) BUMBLEBEE SERIES, RPT # 262 (DEC. 56)*
Form 1277-C

Date 6/7/57
Prepared By JH HANSON
Checked By
Revised Date

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A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA
Model SM-75

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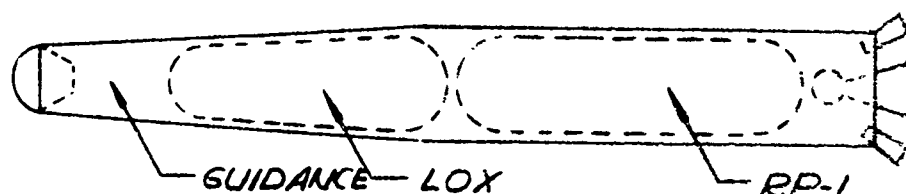
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Report No. ZM-486

SPONSOR: USAF
MFGR: DOUGLAS

THOR



LENGTH. 65'

DIAMETER. 8' MAX.

SPAN. NONE

WEIGHT. 110,000#

WARHEAD. 1500#

GUIDANCE. INERTIAL

PROPULSION SINGLE STAGE. ONE NAA 150,000# THRUST
MOTOR, LIQUID PROP. = RP-1, LOX.

RANGE 1500 N.M.I.

VELOCITY: ~15,000'/SEC.

ALTITUDE APX GEE @ ~350 MI.

REMARKS

SECRET

Date 6/7/57
Prepared By C. HANSON
Checked By
Revised Date

CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA
Model SM-75

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SECRET

Report No. ZM-486

THOR

MISSILE DATA

STRUCTURE-SELF SUPPORTING ALUMINUM
STRUCTURE, USING MILLED SKIN FOR TANKS.
ACCESSORY POWER-HYDRAULIC, PUMP AND
BATTERY INVERTER. CONTROL-MAIN MOTOR,
TWO NAA 1000 LB. THRUST VERNIER MOTORS.
NOSE CONE-3500 LB. GENERAL ELECTRIC
NOSE CONE, COPPER HEAT SINK, SUB SONIC
IMPACT. GUIDANCE SOURCE -(1) AC SPARK
PLUG, TYPE ALL-INERTIAL, (2) BELL TELEPHONE
LAB, TYPE RADIO INERTIAL. FIRST GUIDED
FLIGHT IN OCT. 1957, OPERATIONAL, JULY, 1958.
THOR DELIVERIES AFTER THE MIDDLE OF
1959 = 11/MO.

SECRET

Date 6/7/57
 Prepared By M. HANSON
 Checked By
 Revised Date

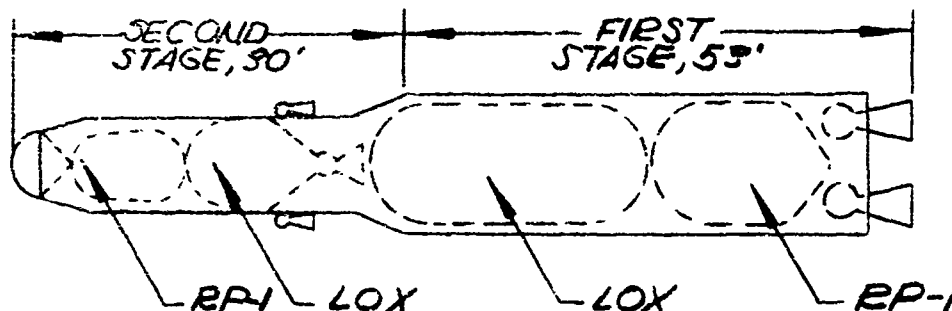
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 A DIVISION OF GEA DYNAMICS CORPORATION
 SAN DIEGO CALIFORNIA
 Model SM-68

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 Temp Penn
 Report No. ZM-486

SECRET

SPONSOR: USAF
 MFGR. MARTIN

TITAN



LENGTH.	FIRST STAGE 53'	SECOND STAGE 30'
DIAMETER.	10'	8'
SPAN:	NONE	
WEIGHT:	222,000 [#]	
WARHEAD:	1500 [#]	
GUIDANCE	INERTIAL	
PROPULSION	(1) STAGE (BOOSTER) - TWO AEROJET 150,000 [#] THRUST MOTORS. (2) STAGE (SUSTAINER) - ONE AEROJET 60,000 [#] THRUST MOTOR. PROP. = RP-1, LOX.	
RANGE:	5500 N. MI.	
VELOCITY	~ M. 23	
ALTITUDE	~ 500 MI.	
REMARKS		

SECRET

Date 6/7/57
Prepared By C. HANSON
Checked By
Revised Date

CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA
Model SM-68

SECRET

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Report No. ZM486

TITAN

MISSILE DATA

TWO STAGE TANDEM MISSILE. STRUCTURE SELF-SUPPORTING ALUMINUM STRUCTURE, USING FRAME-STRINGER CONSTRUCTION. ACCESSORY POWER-AEROJET GAS TURBINE. CONTROL-BOOSTER MOTORS, FIRST STAGE SUSTAINER MOTOR, SECOND STAGE, FOUR 200* THRUST VERNIER MOTORS DURING FIRST AND SECOND STAGE. NOSE CONE-3500* AVCO NOSE CONE, COPPER HEAT SINK, SUBSONIC IMPACT. GUIDANCE-FIRST SOURCE-BELL TELEPHONE LAB., TYPE-RADIO INERTIAL VERNIER STAGE-50 TO 65 SECONDS. ULTIMATE SOURCE-ARMA, TYPE-ALL-INERTIAL. FLIGHT TEST SERIES #1 AND #2 IS IN JUNE AND JULY 1958 RESPECTIVELY. FIRST GUIDED FLIGHT, APRIL 1959. OPERATION-AL JULY 1959. TITAN DELIVERIES BEGINNING FIRST OF 1960 5/MO. THE FLIGHT TEST SERIES #1 WILL BE SINGLE STAGE BOOST PORTION ONLY. THE FLIGHT TEST SERIES #2 WILL BE SECOND STAGE FIRED SEPARATELY.

SECRET

Date 7 SEPT. 1956

Prepared By CHALK

Checked By 7/22/57

Revised Date 8/27/57
C.M. HANSON

CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION

SAN DIEGO, CALIFORNIA

Model XSSM-A-2

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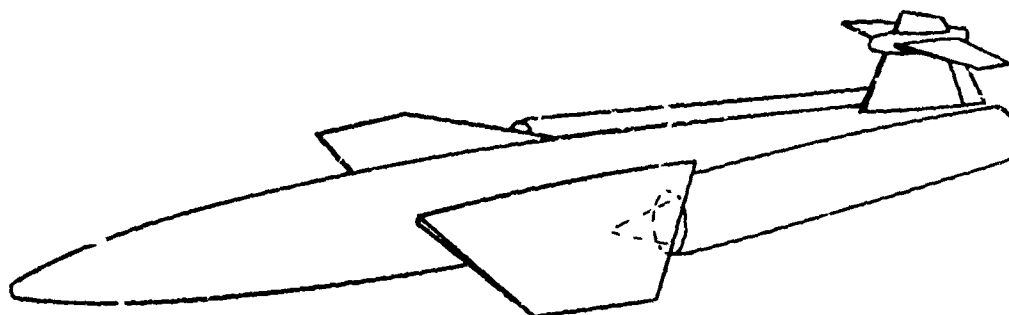
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Report No. ZM-486

SPONSOR: BUORD (JHU)

MFGR:

TRITON



LENGTH: 414" (34.5')

DIAMETER: 34.5"

SPAN: 140"

WEIGHT: GROSS LAUNCH=27,000⁺ START CRUISE=9500⁺

WARHEAD: 1500⁺ (EST.)

GUIDANCE: PHASE I INERTIAL (ATRAU)
" II " & RADAR (SIDE-LOOKING, MAP MATCHING)
" III "

PROPULSION: 2 RAM JETS (CRUISE) (4) 4.1DS-111,000 SOLID
ROCKETS (BOOST)

RANGE: 1200 N.MI.

VELOCITY: M=2.7 (M=3.5)

ALTITUDE: INITIAL 78,000' FINAL 85,000'

REMARKS: TEST VEHICLE TO USE TALOS J-2 COMBUSTOR.
OPERATE @ M 2.7. SUBMARINE LAUNCHED.
INITIAL FLIGHT DEC '57, TACTICAL-PHYSICAL
1963.

SECRET

C.M.C.

REFERENCE: ' APL/JHU T663-42A (30 MAY '56) (0396-56)'
Form 1277-C

Date 5 NOV. '53
Prepared By DITMARS
Checked By
Revised Date 3/25/57
(M. WATSON)

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SAN DIEGO, CALIFORNIA
Model 1AM-4SM

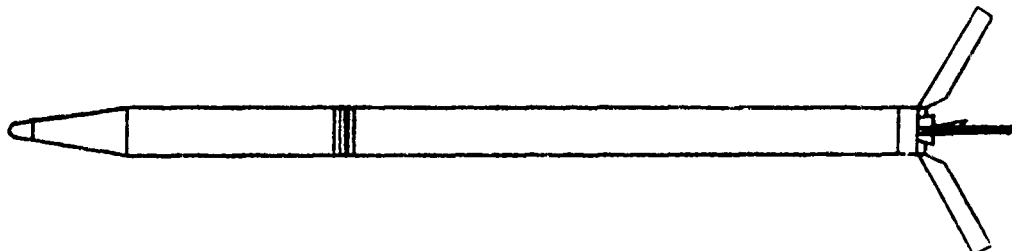
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Report No. ZM-406

SPONSOR: NOTS

MFGR:

ZUNI



LENGTH: 109"

DIAMETER: 5.0" (5.12" OVER FOLDED FINS)

SPAN: 27.2"

WEIGHT: 124#

WARHEAD: 5", 48" CONTINUOUS ROD

GUIDANCE: NONE

PROPULSION: SOLID PROPELLANT ROCKET MOTOR

RANGE: 1,500' WHEN AIR-LAUNCHED @ 500 KNOTS.

VELOCITY: 2,250'/SEC. FOR 7 SEC.

ALTITUDE

REMARKS: HIGH-VELOCITY AIRCRAFT ROCKET WITH FOLDING FINS.

REFERENCE
Form 1277-C

NOTS DWG - PICKENS' FILE, NOTS RPT. # 872 JUNE '52

ANALYSIS
PREPARED BY
CHECKED BY
REVISED BY

C O N V A I R
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO

PAGE
REPORT NO.
MODEL
DATE

CHARACTERISTICS OF RESEARCH MISSILES

Date
Prepared By 5/25/57
Checked By M. HANSON
Revised Date

CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA
Model RESEARCH

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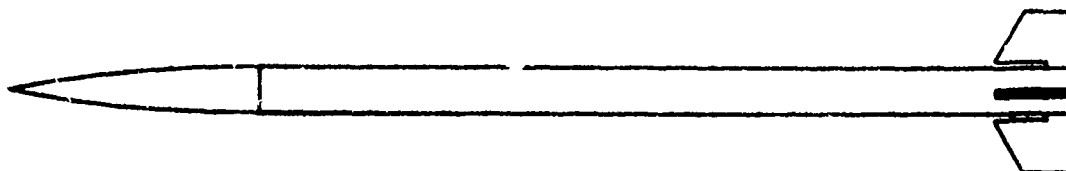
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Report No. ZM-486

SPONSOR: NAVY

MFGR: ATLANTIC RESEARCH CORP.

ARCON



	10 [#] PAYLOAD	40 [#] PAYLOAD
LENGTH:	11'-2"	11'-2"
DIAMETER:	6.094"	6.094"
SPAN:	22.3"	22.3"
WEIGHT:	206.55 [#] MASS RATIO = .692	244.75 [#] MASS RATIO = .584
WARHEAD:		
GUIDANCE:		
PROPULSION:	SOLID: 142.4 [#] , 800 P.S.I. 32.2 SEC. BURNING TIME, THRUST-945 [#]	SOLID: 142.4 [#] , 1200 P.S.I. 32.2 SEC. BURNING TIME, THRUST-975 [#]
RANGE:		
VELOCITY:	5850'/SEC.	4,550'/SEC.
ALTITUDE:	115 MI.	68 MI.
REMARKS:	EXPANSION RATIO 7.5 HIGH ALTITUDE SOUND- ING ROCKET.	EXPANSION RATIO 10

SECRET

REFERENCE:
Form 1277-C

16277 VOL. I

CHARACTERISTICS OF ARCON ROCKET, DITMARS.

Date 9/21/57
Prepared By C. HANSON
Checked By
Revised Date 7/22/57

CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA
Model RESEARCH

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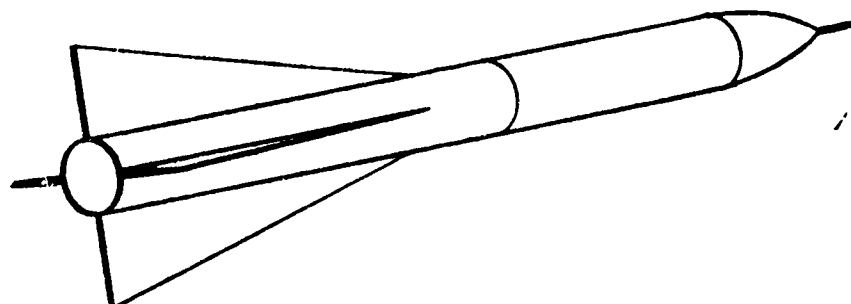
Report No. ZM-986

SPONSOR: BU SHIPS

MFGR: COOPER DEVELOPMENT CORP.

GRAND CENTRAL ROCKET CO.

ASP



LENGTH: 18'

DIAMETER: 6.5"

SPAN: 20"

WEIGHT: 245#

WARHEAD: NONE

GUIDANCE: NONE

PROPULSION: SOLID, SINGLE STAGE, CAN BE USED WITH NIKE BOOSTER

RANGE: VERTICAL TRAJECTORY

VELOCITY: 5700'/SEC.

ALTITUDE: 200,000' WITH 25# PL. & 170,000' WITH 50# PL. WITH NIKE BOOSTER ASP REACHES 850,000' WITH 25# PL.

REMARKS: 51 FLIGHT TESTS HAVE BEEN MADE WITH PERFECT RELIABILITY OF 100% SUCCESSFUL FIRINGS. MOTOR=55 K'S 5800.5# SEC. BURNING TIME. AVERAGE THRUST=5,800#, 106" LONG, 6 1/2" DIA. TOTAL IMPULSE=31,000# SEC. Isp=210. W=169 CAN BE INCREASED TO 188.

SECRET

REFERENCE: JET PROPELLSION (MARCH 1957)

Form 1277-C

Date *5/20/57*

Prepared By *C. M. HANSON*

Checked By

Revised Date

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DIVISION OF GENERAL DYNAMICS CORPORATION

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Model *RESEARCH*

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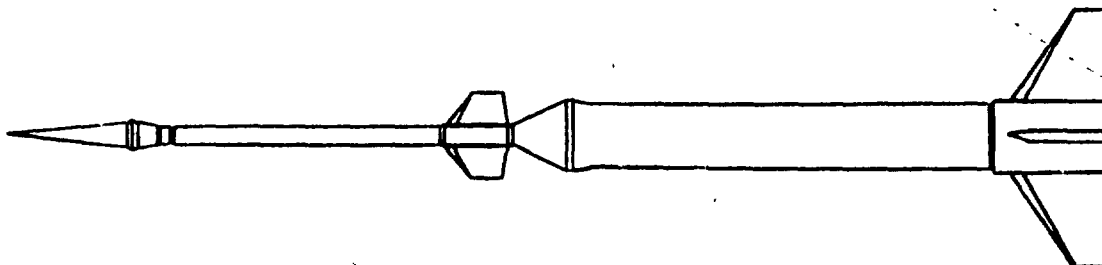
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Report No. *ZM 486*

SPONSOR: *AIR FORCE*

MFGR: *NACA*

DAN (DEACON NIKE)



LENGTH: *DEACON MISSILE = 155.5" NIKE BOOSTER 150.5"*

DIAMETER: *DEACON MISSILE = 6.25" NIKE BOOSTER 16.5"*

SPAN: *DEACON MISSILE = 27" NIKE BOOSTER 62.5"*

WEIGHT: *DEACON MISSILE = 216^{lb} NIKE BOOSTER 1,324^{lb}*

WARHEAD: *NONE*

GUIDANCE: *AN/DPL-19 RADAR BEACON IN NOSE OF DEACON*

PROPULSION: *SOLID = NIKE BOOSTER & DEACON MISSILE*

RANGE: *VERTICAL TRAJECTORY*

VELOCITY: *5150' / SEC (M = 5)*

ALTITUDE: *356,000' PEAK*

REMARKS: *TWO TEST FIRINGS OF DAN (DEACON-NIKE) ROCKET INDICATED THAT ALTITUDES BETWEEN 385,000' & 487,000' MAY BE REACHED WITH PAYLOADS FROM 60^{lb} TO 10^{lb}*

SECRET

REFERENCE: *MISSILES & ROCKETS OCT. 1956*

Form 1277-C

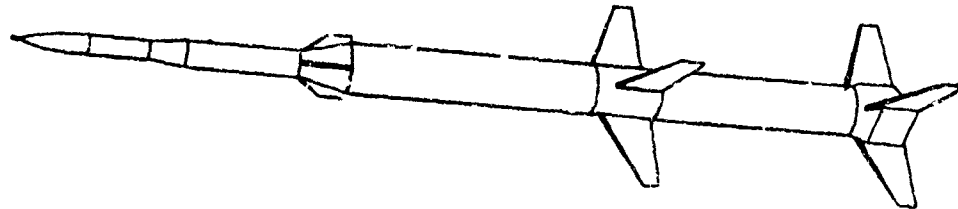
Date 3/22/57
Prepared By C. HANSON
Checked By
Revised Date
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A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA
Model RESEARCH

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Temp Penn

Report No. ZM-486

SPONSOR: NACA
MFGR: COMPOSITE

4) STAGE HYPERSONIC
TEST MISSILE



LENGTH: STAGE (1&2) 135" EA., STAGE (3) 47.69", STAGE (4) 36.7"
DIAMETER: STAGE (1&2) 16.5" EA., STAGE (3) 8.3", STAGE (4) 5.9"
SPAN: STAGE (1&2) 52.5"
WEIGHT: STAGE (1&2) 1180^{lb}, STAGE (3) 47.69^{lb}, STAGE (4) 36.7^{lb}
WARHEAD: NONE
GUIDANCE: NONE
PROPULSION: STAGE (1&2) M-5, SOLID; STAGE (3) THICKOL T-40, SOLID;
STAGE (4) THICKOL T-55, SOLID.
RANGE: VERTICAL TRAJECTORY
VELOCITY: M=10.4
ALTITUDE: 219 STATUE MI.
REMARKS: RESEARCH VEHICLE FOR AERODYNAMIC
HEATING STUDIES

219

REFERENCE: JATO MANUAL,
Form 1277-C

Date 3/22/57
Prepared By CHANDLER
Checked By
Revised Date
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A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA
Model RESEARCH

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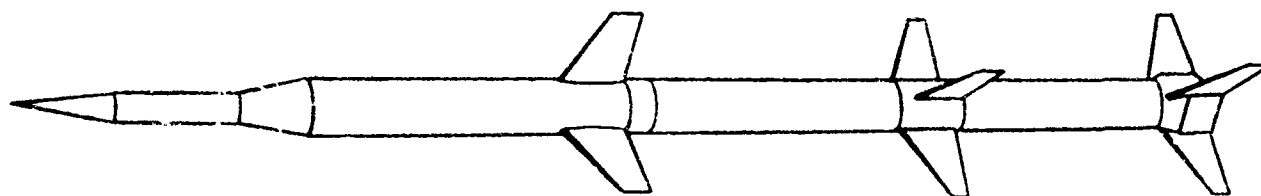
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Report No. ZM-486

SPONSOR: NACA
MFGR: COMPOSITE

FOUR-STAGE TANDEM BOOSTER



LENGTH. STAGE (1) 135", STAGE (2) 135", STAGE (3) 68.8", STAGE (4) 47.7"

DIAMETER: STAGE (1) 16.5", STAGE (2) 16.5", STAGE (3) 15", STAGE (4) 8.3"

SPAN: STAGE (1+2) = 52.5, STAGE (3) 51"

WEIGHT: STAGE (1) 1,180^{lb}, STAGE (2) 1,180^{lb}, STAGE (3) 3 DEACON @ 93^{lb} ea., STAGE (4) 132^{lb}

WARHEAD: NONE

GUIDANCE: NONE

PROPULSION. STAGE (1+2) 115, SOLID; STAGE (3) 3 DEACON, SOLID; STAGE (4) T-40, SOLID.

RANGE:

VELOCITY: 3RD STAGE = M=6

ALTITUDE. 3RD STAGE = 50,000'

REMARKS. HIGH SPEED RESEARCH VEHICLE

Subsonic

REFERENCE. NACA RM L56E20 JULY 27, 1956 & JATO MANUAL
Form 1277-C

Date 3/25/57

Prepared By C.M. HANSON

Checked By

Revised Date

CONVAIR SERVICE

A DIVISION OF GENERAL DYNAMICS CORPORATION

SAN DIEGO, CALIFORNIA

Model RESEARCH

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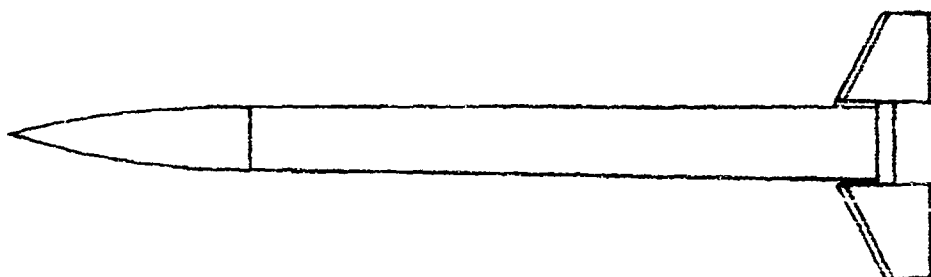
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Report No. ZM-456

SPONSOR: NAVY (NRL)

MFGR: ATLANTIC RESEARCH CORP.

IRIS



LENGTH: 17'-4"

DIAMETER: 12"

SPAN: 40" (EST)

WEIGHT: 1006.5# MASS RATIO = 3.98

WARHEAD: PAYLOAD 100#

GUIDANCE:

PROPULSION 7.48# SOLID, 600 PSI, 4220# THRUST, 40 SEC BURN
ING TIME.

RANGE:

VELOCITY: 7597'/SEC. MAX.

ALTITUDE: 197.1 MI. MAX.

REMARKS: EXPANSION RATIO = 12
READY IN 1958.

SECRET

REFERENCE: CHARACTERISTICS OF IRIS ROCKET, DITMARS
Form 1277-C

Date 9/22/57 **CONVAIR**
Prepared By C.M. HANSON A DIVISION OF GENERAL DYNAMICS CORPORATION
Checked By
Revised Date 7/22/57 SAN DIEGO, CALIFORNIA
Model RESEARCH

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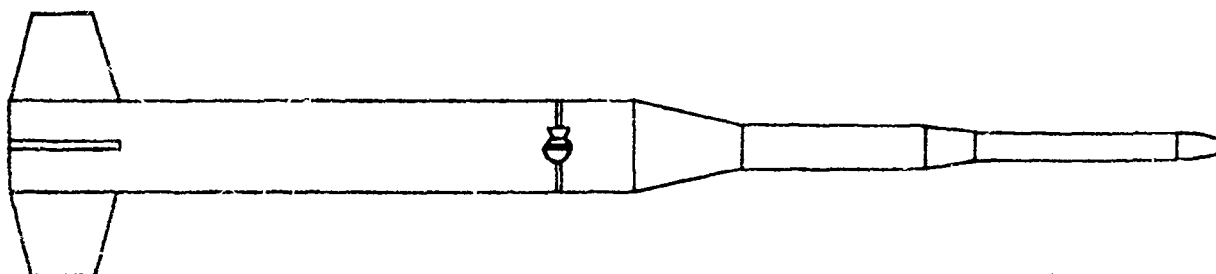
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Report No. ZM-486

SPONSOR: AIR FORCE
MFGR: LOCKHEED

LOCKHEED-X-17



LENGTH: 430"

DIAMETER: 1ST STAGE = 31", 2ND STAGE = 17.5", 3RD STAGE = 8.2"

SPAN: 98"

WEIGHT: APPROX. 10,200#

WARHEAD: NONE

GUIDANCE: NONE

PROPULSION: SOLID PROPELLANT ROCKETS.

RANGE: 300-900 N. MI. (EST.)

VELOCITY: 12,000'/SEC MAX. (EST.)

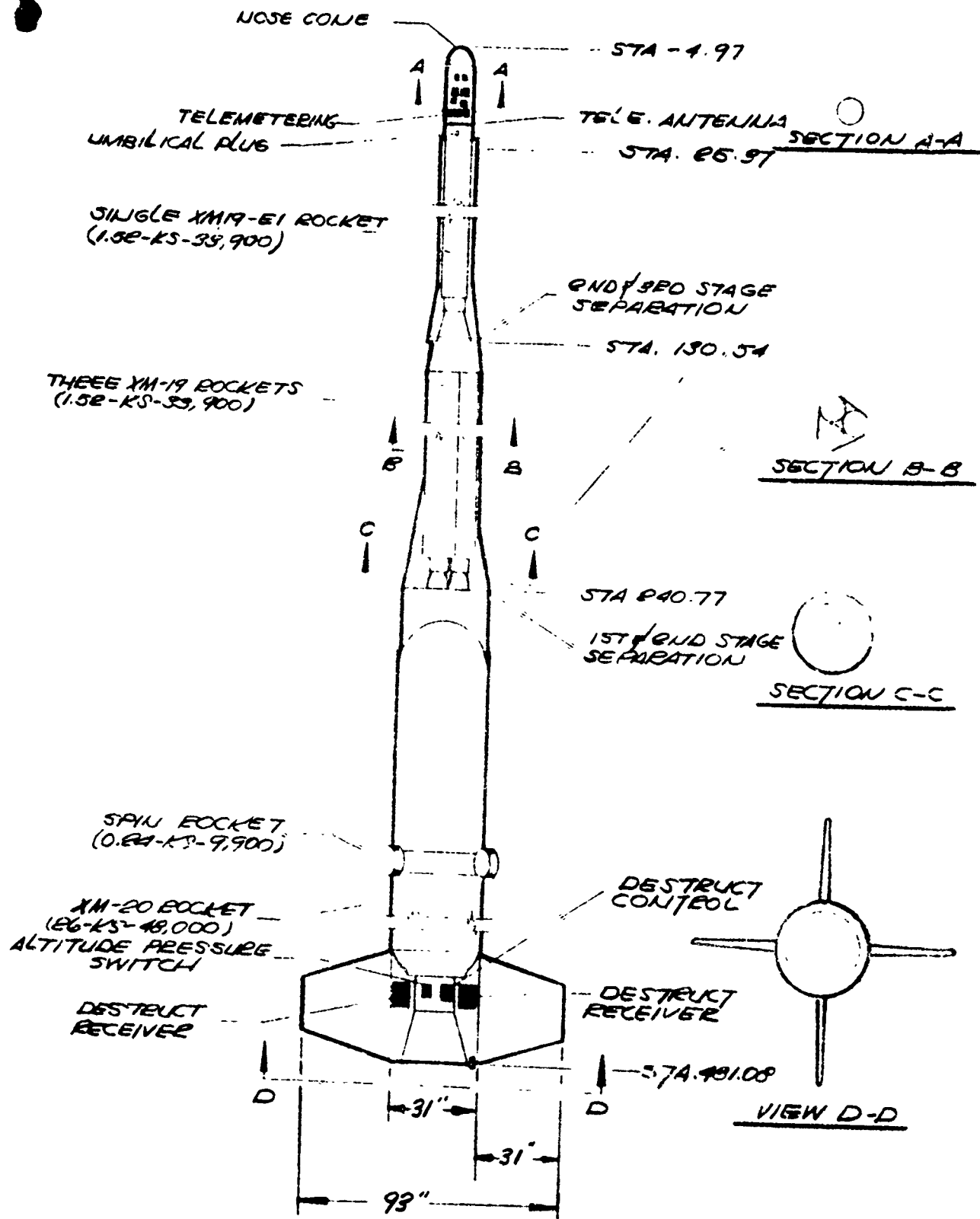
ALTITUDE: HAS REACHED APPROX. 600 MI.

REMARKS: RE-ENTRY TEST VEHICLE BUILT FROM STOCK
SOLID-PROPELLANT UNITS; STAGE 1 = SERGEANT,
STAGE 2 = RECRUIT, STAGE 3 = RECRUIT JATO.
STAGE 1 = 1 SERGEANT - 26 KS - 48,000 -
STAGE 2 = 3 RECRUIT - 1.56 KS - 33,500
STAGE 3 = 1 RECRUIT - 1.52 KS - 33,500
SPIN ROCKETS - 0.24 KS - 48,000

REFERENCE: AVIATION WEEK, FEB. 4, 1957, & JATO MANUAL.

SECRET

LOCKHEED X-17



REF: 16006

SECRET

Date 11-3-54

Prepared By DITMARS

Checked By 7/27/57

Revised Date 3/2/57

C.M. HANSON

CONVAIR SECRET

A DIVISION OF GENERAL DYNAMICS CORPORATION

SAN DIEGO, CALIFORNIA

Model MX-683

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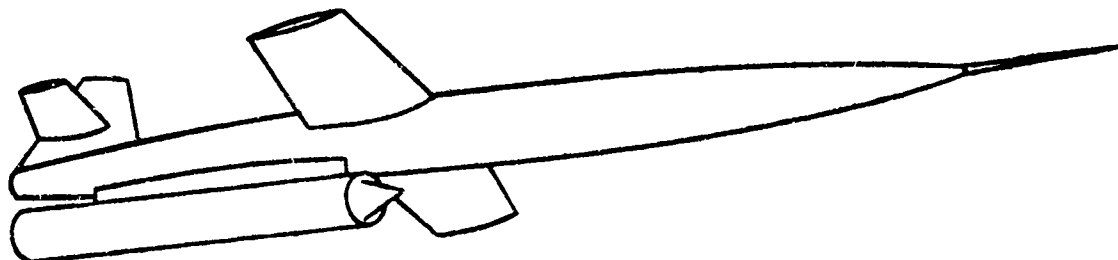
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Report No. ZM-486

SPONSOR: AIR FORCE

MFGR: LOCKHEED

X-7 & Q-5



LENGTH: MISSILE = 595"

BOOSTER = 239"

DIAMETER: " = 20"

" = 32"

SPAN: " = 144"

" = 258"

WEIGHT: " = 3010#

" = 5020#

WARHEAD: NONE - RAMJET TEST VEHICLE

GUIDANCE: AUTOPILOT & PROGRAMMER + RADAR GROUND COMMAND

PROPULSION: RAMJET CRUISE - SOLID PROP. ROCKET BOOST
(405-105,000)

RANGE: UP TO 165 MI (CLOSED COURSE)

VELOCITY: M=1.7 TO M=3.0

ALTITUDE: SEA LEVEL TO 80,000'

REMARKS: DESIGNED TO TEST 20" TO 28" DIA. RAMJET ENGINES,
AIE LAUNCHED FROM B-29 BOOSTED, TO SUPERSONIC
VELOCITY FOR RAMJET OPERATION. DECELERATED
BY DIVE BRAKES, PARACHUTE DEPLOYED,
RECOVERY BY GROUND PENETRATION
SPIKE. DEVELOPED INTO Q-5 RECOVERABLE DROUE.

SECRET

REFERENCE:
Form 1277-C

PR 27 X 7 RJTV (JAN 55) LOCKHEED A. CO.

Date 11-3-54

Prepared By DITMARS

Checked By

Revised Date 3/8/57

C.M. HANSON

CONVAIR

A DIVISION OF GENERAL DYNAMICS CORPORATION

SAN DIEGO, CALIFORNIA

Model X-7

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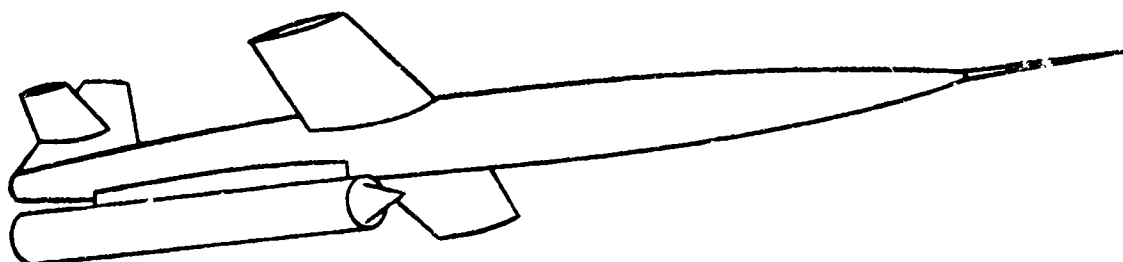
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Report No. ZM-486

SPONSOR: AIR FORCE

MFGR: LOCKHEED

MX-883



LENGTH: MISSILE = 395"

BOOSTER = 239"

DIAMETER: " = 20"

" = 32"

SPAN: " = 144"

" = 258"

WEIGHT: " = 3018#

" = 5020#

WARHEAD: NONE - RAM JET TEST VEHICLE

GUIDANCE: AUTOPILOT & PROGRAMMER + RADAR GROUND COMMAND

PROPULSION: RAM JET CRUISE - SOLID PROP. ROCKET BOOST
(405-105,000)

RANGE: UP TO 165 MI (CLOSED COURSE)

VELOCITY: M=1.7 TO M=3.0

ALTITUDE: SEA LEVEL TO 80,000'

REMARKS: DESIGNED TO TEST 20" TO 28" DIA. RAM JET ENGINES,
AIR LAUNCHED FROM B-29 BOOSTED, TO SUPERSONIC
VELOCITY FOR RAM JET OPERATION. DECELERATED
BY DIVE BRAKES, PARACHUTE DEPLOYED,
RECOVERY BY GROUND PENETRATION
SPIKE.

SECRET

REFERENCE:
Form 1277-C

PR#27 X-7 R/TV (JAN 53) LOCKHEED A.CO.

Date 3/21/57
Prepared By CHANDLER
Checked By
Revised Date
CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA
Model RESEARCH

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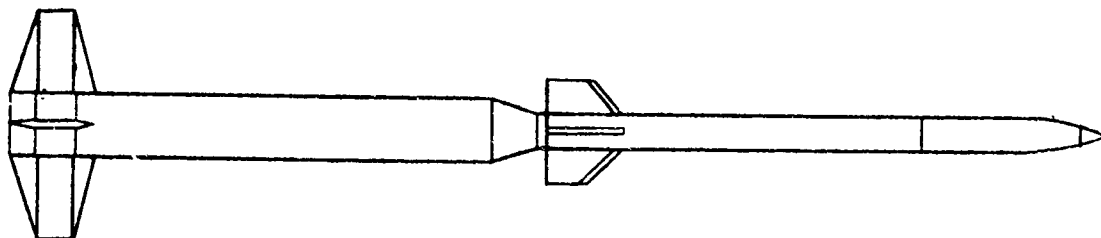
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Report No. ZM-486

SPONSOR: AIR FORCE

MFGR: UNIVERSITY OF MICHIGAN

NIKE-CAJUN



LENGTH: 296.5

DIAMETER: NIKE BOOSTER = 16.5", CAJUN MISSILE = 6.75"

SPAN: BOOSTER = 59.5", MISSILE = 24.75"

WEIGHT: 1550^{lb}

WARHEAD: NONE

GUIDANCE:

PROPULSION: SOLID ROCKET

RANGE:

VELOCITY: M=5.7

ALTITUDE: 100 MI.

REMARKS: CARRIES EQUIPMENT TO TEST OR MEASURE
WATER-VAPOR DISTRIBUTION, EARTH'S MAGNETIC
FIELD, CLOUD STRUCTURE, PRESSURE, TEMP,
DENSITY, WINDS, COSMIC RAYS, & AURORAL PARTICLE.

REFERENCE: JET PROPULSION (MARCH 1957)
Form 1277-C

Date 5/1/57
Prepared By C.M. HANSON
Checked By
Revised Date 7/22/57
CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA
Model RESEARCH

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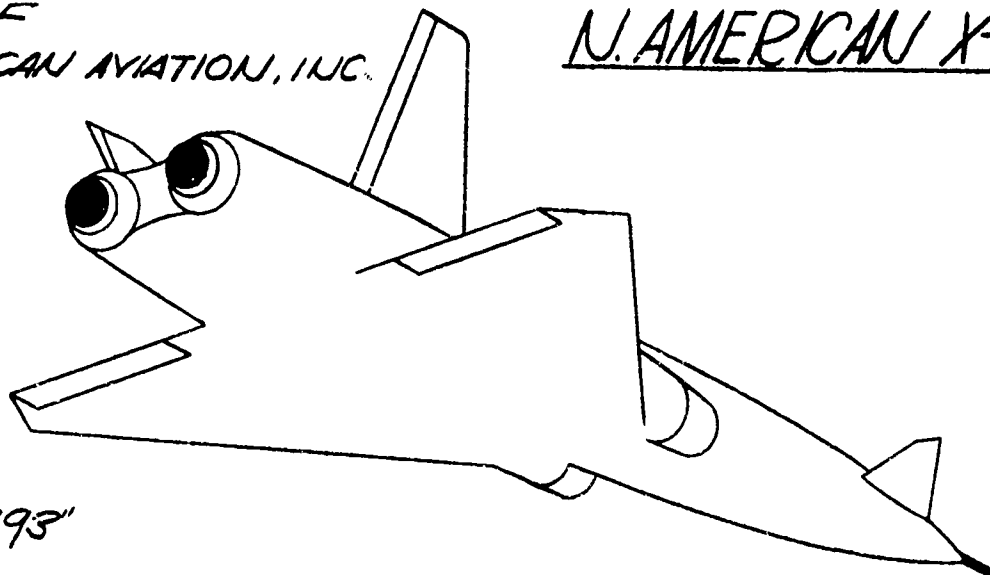
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Report No. ZM-486

SPONSOR: USAF

MFGR. N.AMERICAN AVIATION, INC.

N.AMERICAN X-10



LENGTH 793"

DIAMETER. 68"

SPAN. 337"

WEIGHT (W6) 42,000#

WARHEAD: NONE

GUIDANCE: RADIO COMMAND

PROPULSION (2) XRJ47-W-5 TURBOJET

RANGE 400-800 N.MI.

VELOCITY. M=1.76

ALTITUDE. 50,000'

REMARKS

SECRET

AERODYNAMIC TEST VEHICLE FOR NAUHAO
CONFIGURATION. RECOVERABLE, TRICYCLE
GEAR AND DROGUE CHUTE.

REFERENCE
Form 1277-C

CONVAIR, POMONA RPT. TM 339-42-2 (SEPT. 1956)

Date 5/2/57

Prepared By C. M. HANSON

Checked By

Revised Date

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A DIVISION OF GENERAL DYNAMICS CORPORATION

SAN DIEGO, CALIFORNIA

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Report No. ZM-486

N. AMERICAN X-10

THE X-10 MISSILE REPRESENTS THE FIRST PHASE OF A THREE PHASE MISSILE DEVELOPMENT PROGRAM, DESIGNATED AS AIR FORCE PROJECT MX-770. THE OBJECTIVE OF PROJECT MX-770 IS THE DEVELOPMENT OF A SURFACE-TO-SURFACE MISSILE, CRUISING AT A MACH NUMBER OF 2.75 OR HIGHER, CAPABLE OF CARRYING A HEAVY SPECIAL WARHEAD A DISTANCE OF 5500 N. MILES WITH AN ACCURACY SUCH THAT 50% OF THE MISSILES WILL STRIKE WITHIN 1500 FEET OF A PREDETERMINED TARGET.

THE X-10 MISSILE IS POWERED BY TWO TURBOJET ENGINES AND IS PROVIDED WITH A LANDING GEAR FOR AIRPLANE-TYPE LANDINGS AND TAKEOFFS. AS A TEST VEHICLE, ITS PURPOSE IS TO PROVE THE OVERALL SOUNDNESS OF THE BASIC DESIGN, TO PROVIDE OPERATIONAL EXPERIENCE, AND TO PROVIDE AERODYNAMIC, STRUCTURAL, ENVIRONMENTAL, AND SYSTEMS DATA.

SECRET

REF: N. AMERICAN RPT. AL 1952 (26 MARCH, 54)

Date 5/3/57

Prepared By C.M. HANSON

Checked By

Revised Date

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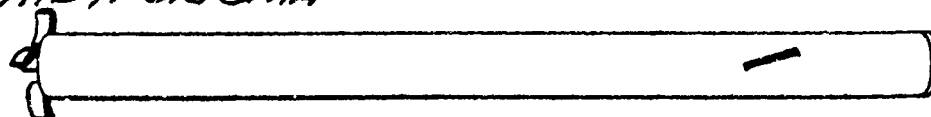
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Report No. ZM-486

SPONSOR NAVY

MFGR. CONVAIR, PONOMA

RED EYE



LENGTH. 42.75"

DIAMETER. 2.5"

SPAN: AFT FINS = 5"

WEIGHT: 14.5# = MISSILE, 18.2# COMPLETE

WARHEAD. 235# (COMPLETE WITH 1.2# HBX)

GUIDANCE. INFRARED HOMING SYSTEM

PROPULSION DUAL STAGE SOLID ROCKET

RANGE 4600 YDS.

VELOCITY. THE INITIAL STAGE = 100'/SEC FOR 0.06 SEC.
SECOND STAGE = 2700'/SEC FOR 5 SEC.

ALTITUDE. DESIGNED FOR DEFENSE AGAINST LOW
LEVEL AIR ATTACK.

REMARKS

SECRET

REFERENCE. CONVAIR, PONOMA RPT. # R6-300-008 (NOV. 1956)

Form 1277-C

Date 5/3/57

Prepared by C. H. HANSON

Checked By

Revised Date

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SAN DIEGO, CALIFORNIA

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Report No. ZM 486

RED EYE

THE RED EYE MISSILE IS 2.5" IN DIA., WEIGHS 14.5# AND IS 42.75" IN LENGTH. IN THIS ENVELOPE ARE PACKAGED AN INFRARED HOMING SYSTEM, EXTENSIBLE CANARD TYPE CONTROL SURFACES, A WARHEAD & FUSE, A DUAL-STAGE ROCKET MOTOR, & FOLDING TAIL SURFACES. THE MISSILE IS ENCLOSED IN A 2.75" DIA. SEALED SHIPPING TUBE THAT, WITH END CAPS REMOVED, BECOMES THE LAUNCHER TUBE.

THE COMPLETE, LAUNCHER ASSEMBLY, WHICH RESEMBLES A BAZOOKA IN SIZE AND APPEARANCE, COMPRISES THE LAUNCHER TUBE CLAMPED TO A GRIPSTOCK. THE GRIPSTOCK CONTAINS A TRIGGER MECHANISM, AND A BATTERY FOR MISSILE WARM-UP AND FIRING. THE ENTIRE WEAPON SYSTEM WEIGHS ONLY 18.2#, APPROXIMATELY THE WEIGHT OF A LOADED BROWNING AUTOMATIC RIFLE.

SECRET

REFERENCE: CONVAIR, FONOMA RPT. #
E6-300-008 (NOV. 1956)

Date 9/19/57

Prepared By C.M. HANSON

Checked By

Revised Date

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A DIVISION OF GENERAL DYNAMICS CORPORATION

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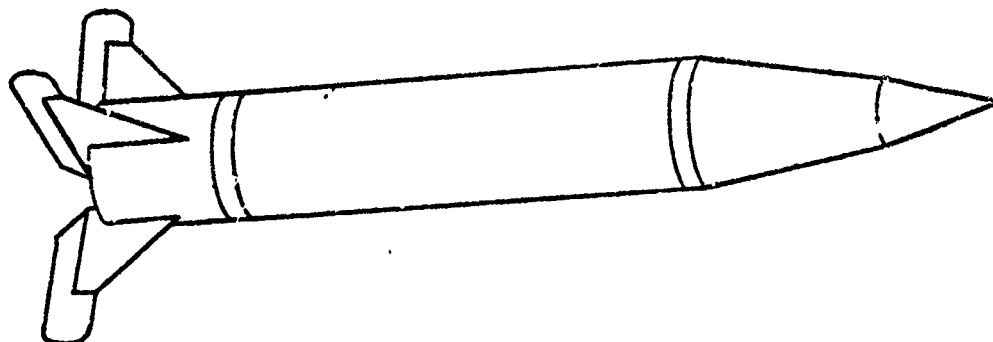
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Report No. ZM-486

SPONSOR: ARMY ORD

MFGR: GENERAL ELECTRIC

RV-A-10



LENGTH: 238"

DIAMETER: 31"

SPAN: 95"

WEIGHT: 6861

WARHEAD: NONE (TEST VEHICLE)

GUIDANCE:

PROPULSION: SOLID, ROUND (1) 4622#, ROUND (2) 4586, " ROUND (3) 4573"

RANGE: ROUND (1) 54 N.M.I., ROUND (2) 50 N.M.I., ROUND (3) 38 N.M.I., ROUND (4) 22 N.M.I.

VELOCITY: MAX. VEL., ROUND (1) 3600'/SEC., ROUND (2) 3400'/SEC., ROUND (3) 3400'/SEC.

ALTITUDE: ROUND (1) 190,000', ROUND (2) 195,000', ROUND (3) 60,000', ROUND (4) 35,000'

REMARKS: FLIGHT TEST EQUIPMENT: BEACON SIGNAL IN TAIL, & TELEMETRY EQUIPMENT.

SECRET

REFERENCE: G.E. 254A0502 - JAN. '54

Form 1277-C

Date 9/21/57

Prepared by F. HANSON

Checked By

Revised Date

CONVAIR SECRET

DIVISION OF GENERAL DYNAMICS CORPORATION

SAN DIEGO, CALIFORNIA

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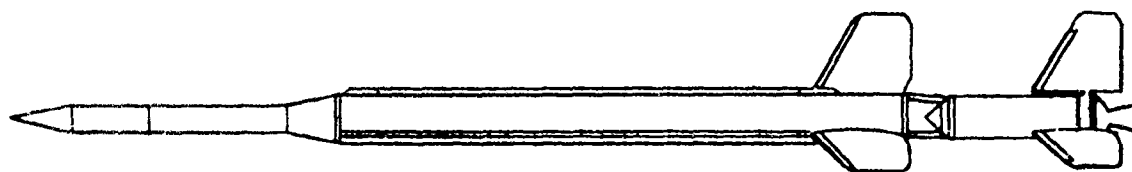
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Report No. ZM-486

SPONSOR: U.S. NAVY/144

MFGR: AEROJET

SPAEROBEE



LENGTH: 375.7"

DIAMETER: STAGE (1) 18.75", STAGE (2) 15", STAGE (3) 8"

SPAN: STAGE (1) 61.99", STAGE (2) 62" STAGE (3) FLARED SKIRT

WEIGHT: STAGE (1) 570#, STAGE (2) 993#, STAGE (3) 116#, PAYLOAD 20#-60#

WARHEAD: NONE

GUIDANCE:

PROPULSION STAGE (1) AEROBEE BOOSTER (SOLID), STAGE (2) AEROBEE (LIQUID), STAGE (3) SOLID, SPARROW SUSTAINER.

RANGE:

VELOCITY: 10,500'/SEC.

ALTITUDE: 400 MI. SUMMIT

REMARKS: HIGH ALTITUDE SOUNDING ROCKET.

SECRET

REFERENCE.
Form 1277-C

JET PROPULSION (MARCH 1957) JATO MANUAL, AEROJET-LIQUID & SOLID PROPELLANT ROCKETS HANDBOOK.

Date 3/20/57

Prepared By C.M. HANSON

Checked By

Revised Date

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DIVISION OF GENERAL DYNAMICS CORPORATION

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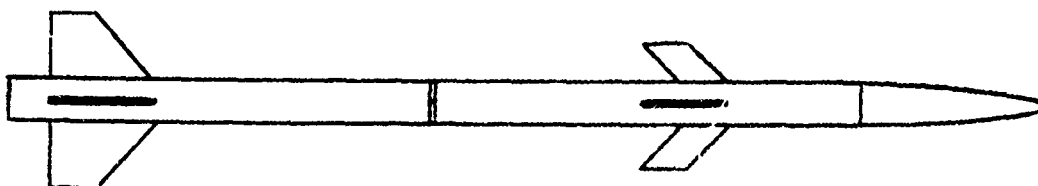
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Report No. ZM 486

SPONSOR: DEPT. OF DEFENSE

MFGR: REPUBLIC AVIATION

TERRAPIN



LENGTH: LESS THAN 15'

DIAMETER: MAX. 6.5"

SPAN: MISSILE - APPROX. 19.9," BOOSTER - APPROX. 26.25"

WEIGHT: 224#

WARHEAD: NONE

GUIDANCE: ALL TRANSISTORIZED TELEMETERING SYSTEM.

PROPULSION: SOLID

RANGE: VERTICAL TRAJECTORY

VELOCITY: 6000'/SEC

ALTITUDE: 80 MI.

REMARKS: PRELIMINARY DESIGN OF THIRD STAGE ROCKET
DESIGNED TO SEND THE TERRAPIN TO 200 MI.

SECRET

REFERENCE: AVIATION WEEK: OCT. 8, 1956

Form 1277-C

Date 4/15/57

Prepared By C. M. HANSON

CONVAIR SECRET

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Checked By

Revised Date 7/22/57

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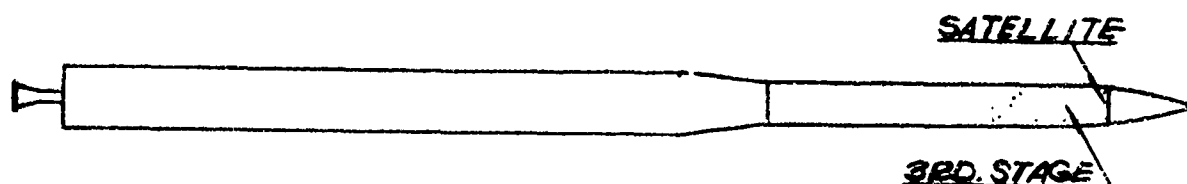
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Report No. ZM-486

SPONSOR: IGY

MFGR: MARTIN

VANGUARD



LENGTH: STAGE (1) = 45', STAGE (2) = 30'

DIAMETER: STAGE (1) = 45", STAGE (2) = 32"

SPAN: NO SURFACES

WEIGHT: 11 TONS, 22,600*

WARHEAD: NONE, 20 IN. SPHERE (SATELLITE), 21 # WITH 10% INSTRUMENTATION, ORBITING @ 200 N.M. - 800 N.M. ALT.

GUIDANCE: RADIO-INERTIAL GUIDANCE SYSTEM MOUNTED SECOND STAGE 3RD STAGE SPIN STABILIZED, VICKERS AUTO-PILOT-APPROX. RADIO GUIDANCE

PROPULSION: STAGE (1) LIQUID (G.E. X405 - KEROSENE & OX) STAGE (2) LIQUID (AEROJET GENERAL A110-37 - UNSYMMETRICAL DIM. ETHYL HYDRAZINE & WHITE FUMING NITRIC ACID) STAGE (3) SOLID.

RANGE: SATELLITE

VELOCITY: STAGE (1) 6075' / SEC, STAGE (2) 14,010' / SEC, STAGE (3) 26,000' / SEC

ALTITUDE: STAGE (1) 35 MI., STAGE (2) 130 MI., STAGE (3) 300 MI.

REMARKS: JOINT EFFORT BY THE SERVICES & NACA
PROPULSION = 90,000* SEC GRAND CENTRAL
MOTOR. 1ST STAGE THRUST = 27,000*, t_b = 146 SEC.
2ND STAGE THRUST = 7,500*, t_b = 120 SEC., 3RD STAGE
THRUST 2,350* t_b = 30 SEC.

SECRET

REFERENCE: Form 1277-C

AMER. ROCKET SOCIETY 424-57, ASTRONAUTICS AUG '57

Date 7 SEPT. 1956
Prepared By CHALK
Checked By
Revised Date

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A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA
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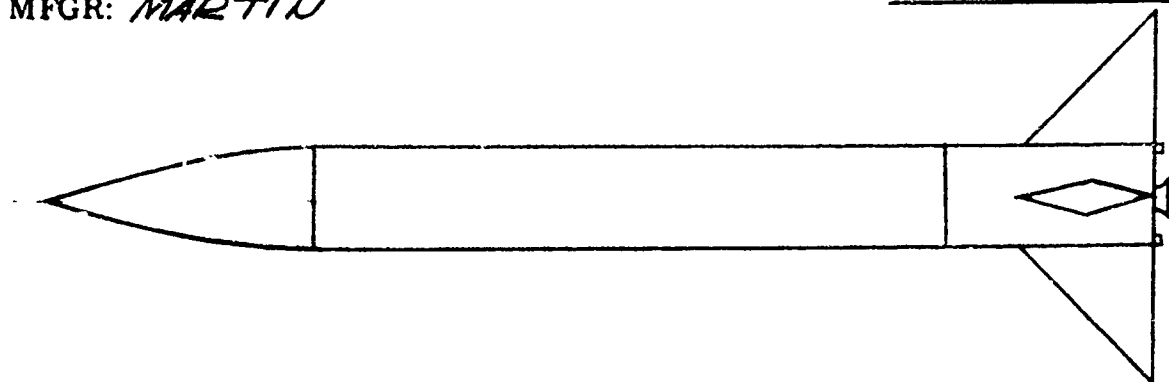
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Report No. ZM486

SPONSOR: NAY4
MFGR: MARTIN

VIKING



LENGTH: 505"

DIAMETER: 45"

SPAN: 160"

WEIGHT: 15,000*

WARHEAD: 500*

GUIDANCE: ALTO-PILOT — GROUND COMMAND

PROPULSION LIQUID ROCKET (ALCOHOL, OXYGEN, & PEROXIDE)
XLR 10-EM-1, 21,000* TH @ S.L.

RANGE: VERTICAL TRAJECTORY

VELOCITY: 7623 FT/SEC.

ALTITUDE: 227.3 MI

REMARKS. ROCKET GIMBALLED (PITCH & YAW) ROLL CONTROL-
AXILLIARY JETS (H₂O₂) & TABS ON TWO FINS-
ATTITUDE JETS ALSO H₂O₂

REFERENCE. 06114
Form 1277-C

Date 3/25/57

Prepared By M. J. HANSON

Checked By

Revised Date

CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION

SAN DIEGO, CALIFORNIA

Model RESEARCH

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Report No. ZM-486

SPONSOR:

MFGR: COOPER DEVELOPMENT
& GRAND CENTRAL ROCKET CO.

WASP

LENGTH: MISSILE = 40" , BOOSTER = 63"

DIAMETER: MISSILE = 1 3/8" , BOOSTER = 3"

SPAN:

WEIGHT: 24# (TYPE #1 BOOSTER) , 29# (TYPE #2 BOOSTER)

WARHEAD:

GUIDANCE:

PROPULSION: SOLID PROPELLANT ROCKET

RANGE:

VELOCITY: TYPE #2 BOOSTER = > 3400 M.P.H.

ALTITUDE: 21 MI. MAX RANGE

REMARKS:

EXTREMELY LIGHT-WEIGHT VEHICLE, IS
INTENDED FOR METEOROLOGICAL AND
OTHER SCIENTIFIC RESEARCH AT MODERATE
ALTITUDE. TWO BOOSTERS ARE AVAILABLE.

SECRET

REFERENCE:
Form 1277-C

MISSILES & ROCKETS MARCH, 1957

ANALYSIS
PREPARED BY
CHECKED BY
REVISED BY

C O N V A I R
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO

PAGE
REPORT NO.
MODEL
DATE

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checked. The information contained should be used
accordingly.

SECRET

S.A.M. PHYSICAL CHARACTERISTIC

NAME	COUNTRY	RANGE IN NAUTICAL MILES	ALTITUDE		TOTAL LAUNCH WEIGHT IN LBS	TOTAL LAUNCH LENGTH IN INCHES	MAXIMUM MISSILE VELOCITY
			MAXIMUM IN FT - 103	MINIMUM IN FEET			
SEA SPARROW	U.S.A.	6	40	50	WITHOUT BOOSTER 375	WITHOUT BOOSTER 144	MACH 2.5
TARTAR	U.S.A.	9	50	50	1150	174	MACH 1.86
HAWK I	U.S.A.	13	60	50	1300	195	MACH 2.5
TERRIER BW-1	U.S.A.	10	37	ANGLE OF P	2470	319	MACH 1.75
TERRIER BT-3	U.S.A.	15	65	ANGLE OF P	2775	320	MACH 3.5
TERRIER HT-3	U.S.A.	26	80	50	3700	ABOUT 320	MACH 3.4
NIKE I	U.S.A.	25	60	NO LOW ALTITUDE CAPABILITY	2325	396	MACH 2.5
NIKE B	U.S.A.	50	80	NO LOW ALTITUDE CAPABILITY WITHOUT NUCLEAR WARHEAD	9965	470	MACH 3.5
TALOS SAM-N-66	U.S.A.	50	60	VERY LIMITED LOW ALTITUDE CAPABILITY	6950	360	MACH 1.85
TALOS SAM-N-66W	U.S.A.	50	60	VERY LIMITED LOW ALTITUDE CAPABILITY WITHOUT NUCLEAR WARHEAD	7100	372	MACH 1.85
TALOS SAM-N-661	U.S.A.	100	70	VERY LIMITED LOW ALTITUDE CAPABILITY	7500	386	MACH 2.1
TALOS SAM-N-66W1	U.S.A.	100	70	VERY LIMITED LOW ALTITUDE CAPABILITY WITHOUT NUCLEAR WARHEAD	7650	398	MACH 2.1
BOMARC F 99A	U.S.A.	125	60	VERY LIMITED LOW ALTITUDE CAPABILITY	12,250	494	MACH 2.5
BOMARC ADV	U.S.A.	250	80	VERY LIMITED LOW ALTITUDE CAPABILITY		494	MACH 2.7
PLATO ADVANCE SAM	U.S.A.	(STUDY - ASRB)					
AKBM	U.S.A.	(BELL LAB STUDY - AICBM)					
	U.S.A.	(CONVAIR STUDY)					
OERLIKON	SWISS	10	65		600	178	MACH 2.0
SEASLUG	BRITISH	15	50	150	3650	234	MACH 2.0
RED SHOES	BRITISH	25	40	100	3500	249	MACH 2.0
RED DUSTER	BRITISH	20	60	100	4000	306	MACH 2.2

TABLE I

SECRET

SECRET

ANCILLARY EQUIPMENT

NAME	AIR SEARCH	HEIGHT FINDING	DESIG SYSTEM	ILLUMINATE OR CONTROL	TRACKING	HOMING	LAUNCHER
SEA SPARROW	SPS-6	NONE	MANUAL			DPN-24	ZERO LENGTH
TARTAR	SPS-28	SPS-26	MK 5	SPG-51	SPG-51	MOD DPN-24	ZERO LENGTH
HAWK I	MOD. TPS-1D	MOD. MPS-6	NO INFO	MOD. SP-1M	MOD. SP-1M	DPN-24	ZERO LENGTH
TERKIER BW-1	SPS-12	SPS-8A	MK 7	MK 25-7 SPQ-5	MK 25-7	NO	ZERO LENGTH
TERRIER BT-3	SPS-12	SPS-26	MK 7	SPQ-6	JPQ-6	NO	ZERO LENGTH
TERRIER MT-3	SPS-28	SPS-26	MK 7	SPQ-6	SPQ-6	MOD DPN-24	ZERO LENGTH
NIKE I	FPS-2	FPS-6	M-33	MTR MONOPULSE	TTR MONOPULSE	NO	MONORAIL -85°
NIKE B	FPS-2	FPS-6	M-33	MTR MONOPULSE	TTR MONOPULSE	NO	MONORAIL -85°
TALOS	SPS-28	SPS-26	NO INFO	SPG-49	SPG-49	INTER FEROMETER	ZERO LENGTH
BOMARC	FPS-2	FPS-6	SAGE	FPS-3	FPS-3	APQ-41	CONCRETE LAUNCH PAD

TABLE II

SECRET

SUPPLEMENTARY INFORMATION ON ELECTRONIC EQUIPMENT

SECRET

RADAR	FREQ BAND	RANGE (N.M.)*	STABILIZED	USE
SPS-6	L	50	NO	E/W
SPS-12	L	50	YES (ROLL ONLY)	E/W
SPS-28	P OR L	150	NO	E/W
SPS-26	S	90	YES	E/W AND H/F
SPS-8A	S	90	YES	H/F
FPS-2	P	500	YES	E/W AND H/F
TPS-1D	L	58	NO	E/W
FPS-3	L	300	NO	E/W
MK-25-7	X	20	YES	(TERRIER) TRACKING
SPQ-5	X	27	YES (+CW INJECTION FOR HT-3)	(TERRIER) TRACKING
SPQ-6	X	30	YES (+CW INJECTION FOR HT-3)	(TERRIER) TRACKING
SPG-51	X	20	YES (+CW INJECTION FOR TARTAR)	(TARTAR) TRACKING
SPG-49	X	50 (WILL BE INCREASED TO 100 N.M.)	YES	(TALOS) TRACKING
CXRX (MOD SPS-8A)	S	30	YES	(TARGET) TRACKING

*90% P_d ON 1 SQ METER TARGET @ 2 VF JETS

TABLE III

SECRET

SECRET

S.A.M. GENERAL INFORMATION

NAME	DEFENSE APPLICATION	PRIME CONTRACTOR	MAJOR SUB-CONTRACTORS	PRESENT STATUS	RELIA- BILITY	BASIS	GENERAL OBSERVATIONS	FUTURE
SEA SPARROW (USN)	TASK FORCE	RAYTHEON	GUIDANCE: RAYTHEON AERJET: DOUGLAS	DORMANT	70%	12 ENGINEERING TEST FLIGHTS	NONE	PROBABLY NONE
TARTAR (USN)	TASK FORCE	CONVAIR	CONVAIR	DESIGN			COULD BE ADAPTED TO USMC USE	HAS GOOD GROWTH POTENTIAL IN RANGE & ALTITUDE
NAIR 1 (USA)	POINT DEFENSE	RAYTHEON	CONVAIR	ENGINEERING TEST FLIGHTS			MAJOR TARTAR COMPETITOR	NAIR JUNE RESULTS DESTROYED DRONE
TERRIER BT-1 (USN)	TASK FORCE AND POINT DEFENSE	CONVAIR	MOTOROLA	PILOT LINE PRODUCTION	70%	10 ENGINEERING TEST FLIGHTS	ON 135 POUNDS TERRIER 1A EXHIBITED A 60% SUCCESS AS OF JAN '74	GROWTH INTO BT-3
TERRIER BT-3 (USN)	TASK FORCE AND POINT DEFENSE	CONVAIR	CONVAIR	DESIGN				GROWTH INTO MT-3
FERRIER HT-3 (USN)	TASK FORCE AND POINT DEFENSE	CONVAIR	CONVAIR	DESIGN				PROBABLE USE AGAINST ASM SSCM POSSIBLE USE AGAINST SRBM & ICBM
NIRE 1 (USAF)	POINT DEFENSE	BELL TEL.	WESTERN ELECTRIC	PRODUCTION	61%	600 POUNDS ALL FLIGHTS		GROWTH POTENTIAL INTO NIRE 8
NIRE 8 (USAF)	AREA	WESTERN ELECTRIC	WESTERN ELECTRIC	SYSTEM FLIGHT TESTS	29%	16 ENGINEERING TEST FLIGHTS		PROBABLE USE AGAINST ASM SSCM POSSIBLE USE AGAINST SRBM & ICBM
TALOS 45 (USN & USAF)	TASK FORCE AREA	BENDIX	FEDERAL	PRODUCTION	70%	25 FLIGHTS WITH SLEEKER 30 FLIGHTS WITHOUT SLEEKER		PROBABLE USE AGAINST ASM SSCM POSSIBLE USE AGAINST SRBM & ICBM
UOMARC F 99A (USAF)	AREA	BOEING	BOEING & G.E.	ENGINEERING TEST FLIGHTS	60%	25 TEST FLIGHTS NOT INCLUDING GUIDANCE		PROBABLE USE AGAINST ASM SSCM POSSIBLE USE AGAINST SRBM & ICBM
BONARC ADV. (USAF)	AREA	BOEING	BOEING & G.E.	DESIGN				PROBABLE USE AGAINST ASM SSCM POSSIBLE USE AGAINST SRBM & ICBM
PLATO (USAF)	POINT DEFENSE	CORNELL	SYLVANIA	STUDY			FEASIBILITY STUDIES FOR AN ASBOM	
ADV. BELL (USAF)	?	BELL TEL.		STUDY			AN AICBM STUDY	
AICBM (USAF)	POINT DEFENSE	CONVAIR		STUDY			AN AICBM STUDY	
AICBM (USAF)	?	DOUGLAS		STUDY				
AICBM (USAF)	?	LOCKHEED		STUDY				
DERLION (COMMERCIAL)	POINT DEFENSE	DERLION					5 YRS BEHIND NIRE PROGRAM	
SEA SLUG (BRITISH NAVY)	TASK FORCE	WHITWORTH AIRCRAFT LTD.		SYSTEM TESTS			COMPETITION FOR BRITISH TERRIER BUSINESS	
RED SHOES (BRITISH ARMY)	POINT DEFENSE	ENGLISH ELECTRIC CO.		SYSTEM TESTS				
RED DUSTER (BRITISH ARMY)	POINT DEFENSE	BRISTOL		SYSTEM TESTS				
	DEFENSE	ARO CO.		SYSTEM TESTS				

TABLE IV

SECRET

SECRET

A.A.M. SYSTEM - INFORMATION

NAME	DESIG	SERVICE	AIRCRAFT SCHEDULED TO CARRY	DATE	TYPE GUIDANCE EQPMT	NO. TO BE CARRIED	PK OR CPE	LAUNCHER TYPE
FALCON	GAR-1	USAF	F89H	1956	E9	6	.5-.9 SALVO OF 6	MOD D
			F102A	1956	MG3			ZERO LENGTH & FINITE
	GAR-1A	USAF	F102B	1958	MX-1179	6	.5-.95 SALVO OF 6	MOD D
			F89H	1957	MX-1179			ZERO LENGTH & FINITE
	GAR-1B	USAF	F102B	1959	E9 & MG3	6	.5-.95 SALVO OF 3	PYLON
SPARROW I			F100		I.R. SEEKER			
	AAM-N-2	USN	F7U-3M	1956	APQ-51	4	.78 FOR RIPPLE OF 2	AERO-1A FINITE
SPARROW I			F3H-2M	1957				
	AAM-N-26	USN			MODIFIED APQ-51	4	33 FT	EXTENDED ARM
SPARROW II			F5D	1959	APN-21	4	30 FT	EXTENDED ARM
	XAAM-N-1	USN			APN-24	4	25 FT	EXTENDED ARM
SPARROW III	XAAM-N-6	USN						
SIDEWINDER			F9F	1956	I.R. SEEKER	6	5 FT	MOD D SPECIAL RAIL
	AAM-N-7	USN	FJ-3 & 4	1956				
DINGDONG			F100					
			F3H					
			F104					
			F8V					
BLUE JAY		USAF	F89H	1956	(UN-GUIDED)	2	.99 SALVO OF 2	RAIL
			F102A	1958				
			F106	1958				
			F101	1958				
BLUE SKY		RAF	HUNTER & SWIFT	1958	I.R. SEEKER		5 FT	
		RAF	SWIFT & F4	1957				

TABLE II

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A.A.M. GENERAL INFORMATION

NAME	PRIME CONTRACTOR	MAJOR SUB-CONTRACTORS			PRESENT STATUS	RELIABILITY	BASIS	GENERAL OBSERVATION	FUTURE
		GUIDANCE	PROPULSION	AIRFRAME					
FALCON	GAR-1 HUGHES	HUGHES	THIOL	HUGHES	PRODUCTION	30%	APPROX 300 TEST VEHICLES		
	GAR-1A HUGHES	HUGHES	THIOL	HUGHES	R & D				
	GAR-1B HUGHES	HUGHES	THIOL	HUGHES	R & D				
SPARROW I	AAM-N-1 SPERRY	SPERRY	AEROJET	DOUGLAS	PRODUCTION FLIGHT		228 FLTS 7/54		
	AAM-N-2 SPERRY	SPERRY	AEROJET	DOUGLAS	TESTING				
SPARROW II	XAM-N-3 DOUGLAS	BENDIX	AEROJET	DOUGLAS	FLIGHT TESTING				
SPARROW III	XAM-N-6 RAYTHEON	RAYTHEON	AEROJET	DOUGLAS	FLIGHT TESTING				
DING DONG	DOUGLAS	HUGHES	AEROJET	DOUGLAS	OPS EVAL.	70%	APPROX 10 FLTS		
SIDE WINDER	AAM-N-7 PHILCO	PHILCO	REACTION MFRS.	PHILCO	PRODUCTION	70%	APPROX 100 TEST FLIGHTS		
BLUE JAY	DEHAVILAND								
BLUE SKY	FAIREY				PRODUCTION				

TABLE III

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A.A.M. PROGRAM SCHEDULES

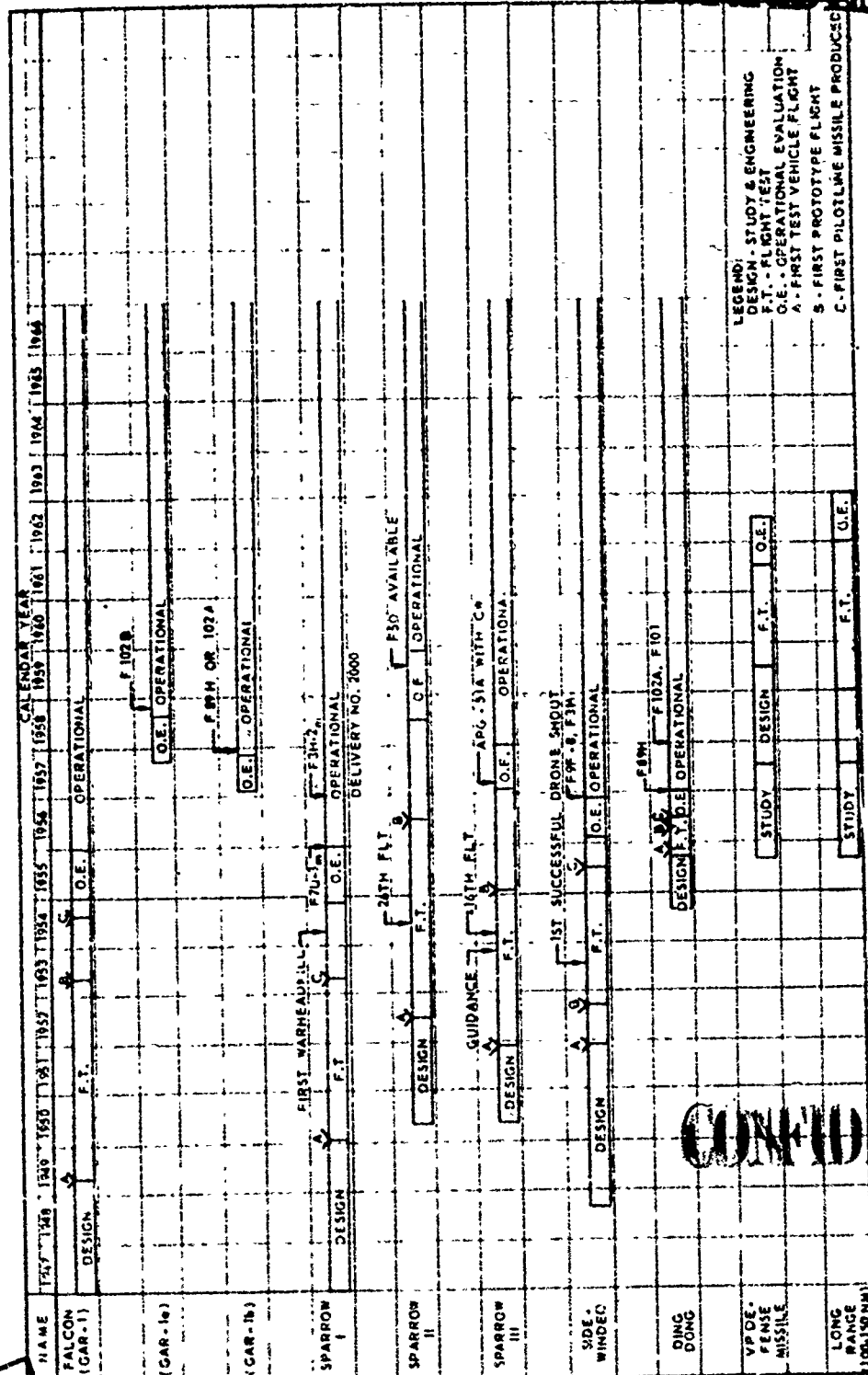


TABLE IV

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